FISHING, FARMING AND FORESTRY

Resources for the Future

Maine State Planning Office
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PREFACE

The following report is actually the result of two separate study efforts that, while commissioned by different Legislative committees, both addressed Fishing, Farming and Forestry in Maine.

The first study came about from LD 1665, *An Act to Promote Natural Resource-based Industries*, which, in its final form as Resolve 99, required the State Planning Office to report back to the Business and Economic Development Committee on several issues including: business development resources currently being invested in these three industries, labor force availability, age and wages paid in these sectors, educational programs at both the secondary and post-secondary levels supporting these industries, and the barriers to and opportunities for enhancing the viability and growth of Maine's natural resource based industry.

The second study resulted from LD 2600, *An Act to Implement the Land Use Recommendations of the Task Force on State Office Building Location, Other State Growth-related Capital Investments and Patterns of Development*. Section 17 of this bill charged the Land and Water Resources Council with submitting a report to the Joint Standing Committees of the Legislature having jurisdiction over natural resource matters, agriculture, conservation and forestry matters and taxation matters with an evaluation of and recommendations on "the use of incentives to keep land in productive farming, fishing and forestry".

In January, as the work of the separate study groups came to a close and the reports were being completed, the Land and Water Resources Council voted to combine the two reports in an effort to minimize confusion and synthesize information.

The resulting report is a comprehensive view of the history and heritage of Maine's natural resource based industries, their economic contribution, the business incentives currently offered for development, the supporting educational structure, the major opportunities for and barriers to further development of these industries and recommendations for ensuring the long term viability of these industries including providing these industries with access to the very resources they need by incentivizing land owners to keep productive lands in productive uses.

It should be noted that the recommendations contained in this document represent the work and opinion of a wide array of stakeholders in these three industries and are meant to provide possible policy options to ensure the long-term viability of the industry base under examination. This report should be characterized as recommendations for further consideration but are not necessarily Administration proposals except where specifically noted.

ACKNOWLEDGEMENTS

We gratefully acknowledge the following individuals for their many hours of dedicated service.

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LD 1665

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I. EXECUTIVE SUMMARY

Introduction

In the spring of 2000, the 119th Maine Legislature directed the State Planning Office to undertake a study of the current condition of and outlook for Maine's fishing, farming and forestry industries. The Legislative Resolve put forth four directives:

1. To examine the status of these three industries in terms of age of the workforce, wages, economic contribution and projected growth,
2. To determine the percentage of business development resources being invested in the industries,
3. To study existing educational programs and to develop a proposal for secondary and postsecondary institutions supplying labor to these industries, and
4. To identify the opportunities for and barriers to further development of fishing, farming and forestry in Maine.

An advisory council of 18 professionals from 14 different government agencies, educational institutions and companies was formed to undertake the research. Further, Council members reached out to established stakeholder groups to engage them in this work and to gain the benefit of their vast experience. The report that follows details the findings of the 8-month research effort and provides both overarching and industry-specific recommendations for positioning these three industries to grow and prosper in the years ahead.

Economic Contribution

Fishing, Farming and Forestry are the foundational industries on which the state's economy and persona were built. While the dominance of these three industries has diminished, they still have a significant presence as they currently provide 8.3% of Maine's jobs and 9.6% of the State's Gross State Product (GSP). Job growth has stagnated over the past 30 years in these industries, and while value added has grown, it has not kept pace with value added growth in other sectors of the Maine economy. The direct economic contribution of these industries underestimates their importance to Maine's people, economy and culture, as these industries are the primary stewards of the rural landscape on which Maine's vital Tourism Industry and its emerging Retirement Industry are built, and which serves as an attractant to college students, entrepreneurs and researchers seeking a high "quality of place".

Although it is commonly believed that workers in these natural resource based industries are an older, dying breed, our research shows that, while ages vary widely across occupations, the 64,000 workers employed in these industries are not dramatically older than those in other industries. There are tremendous variations in the wages and benefits across the three industries, with the Paper Industry providing an average wage of $52,543, among the highest in the state and Agricultural, Forest and Farming Services at $6,750, among the very lowest in Maine.

Business Development Resources

Over a recent 12-month period, firms in the 3 industries under study garnered a full 36% ($128 million out of $358 million) of all direct business development resources provided in the form of tax breaks, loans, grants, training and technical assistance. The relative share of development resources that each industry received was significantly larger than that industry's contribution to Gross State Product. Forestry (7% of GSP) was awarded 25% of total business development resources, Farming (2% of GSP) received 10% of resources and Fishing[1] (0.5% of GSP) collected 1% of the development incentives. While this study identifies a critical need for worker training and technical assistance, only 1% of the development resources are currently aimed at this and fully 90% of the resources provided take the form of tax breaks or loans.

Educational Programs

At all levels, the State's educational institutions support the fishing, farming and forestry industries through some combination of teaching, research and public outreach and services. At the secondary level, the State spent $1.1 million last year on 10 natural resource program areas. The Technical Colleges have 162 FTE enrolled in their natural resource programs. The University has 1,310 enrolled in its College of Natural Science, Forestry and Agriculture, with an additional 229 graduate students, and this College captured $12 million in research awards for the school year 1999/2000. In three areas of natural resource study, there currently exists an "education ladder" of sorts which allows students in some towns to progress from High School to the Technical College to the University in their specified area of study (e.g. Agri-business, Pulp and Paper Technology or Biotechnology).

Opportunities and Barriers

The Council identified a myriad of opportunities and challenges which were grouped into 4 primary issues areas, around which the recommendations have been organized. The issue areas include:

1. Educational Programs: While natural resource programs are in place at all levels of Maine's educational system, opportunities exist to create greater awareness of and excitement in these industries more broadly across the state and to far better develop critical linkages and educational paths between the state's secondary and post-secondary institutions that would encourage and enable students to progress to higher levels of formal training.
2. Small Business Support: Like the greater community of small businesses in Maine, firms in these 3 sectors face numerous challenges due to their size, including inadequate knowledge of and access to technical support for business development, training and skill development, and affordable health and other insurances.
3. Access to the Resource: Maine's Fishing, Farming and Forestry sectors are under tremendous pressure from real estate development, making it increasingly difficult to access the very resources (namely the forests, coastal waterfront, and farmland) they need to operate.

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[1] Fishing statistics significantly undercount the contribution this industry makes to G.S.P. (See Appendix F)

4. Clear, Stable Public Policy: The lack of clear, stable public policy had weakened the viability of fishing, farming and forestry operations and has muted investment in these natural resource industries.

Overarching Recommendations

Industry-specific recommendations have been developed by stakeholder groups with expertise in each individual industry and are presented in Section IV of this report (page 89). Detailed recommendations on using incentives to keep land in productive farming, fishing and forestry can be seen in Appendix H.

The overarching recommendations, those which generally apply to all three sectors and which are believed to provide the best opportunities for keeping Maine's natural resource based industries viable, are detailed in Section II-D and are highlighted below:

1. Educational Programs: Students in Maine's K-12 public school system should be made aware of the historical and economic importance of these three foundational industries by fully implementing the natural resource, entrepreneurship and business education elements of the Maine Learning Results, and by expanding both the "Ag in the Classroom" curriculum and the "Economics at Work" tech prep program. In addition, an "education ladder", bridging the Secondary, Technical College and University Systems through articulation agreements, should be expanded from the 3 areas now offered to all natural resource program areas, encouraging and enabling students to continue their formal education to the highest possible level.
2. Small Business Support: Consortia across all natural resource based industries should be formed to address the critical need for access to affordable health and other insurances. Multi-agency teams should work with industry stakeholders to expand Maine's capacity for new product development and new processing technologies, to support and expand joint marketing efforts for Maine's agricultural, marine and forest products, and to deal with shared issues concerning labor, training and development resources.
3. Access to the Resource and 4. Clear, Stable Public Policy: Legacy programs should be developed that enable inter-generational transfers of large land holdings, keeping farms and woodlots in productive use. Further, in an effort to protect the state's fishing, farming and forestry land base from real estate development pressures, Maine's tax and economic development policies (such as current use valuation and the Right to Farm Law) must be expanded to cover all major natural resource based industries, must be applied consistently across these sectors and must be adequately funded to fulfill their purpose. Once these policies and programs are comprehensive, consistent, and fully funded, every effort should be made to stabilize them so as to avoid the disincentive to investment that is caused by unstable public policy in such areas as workers' compensation and the Tree Growth Tax program. Policy makers are urged to modify the referendum process in such a way as to mitigate the opportunity costs of deferred or lost investment due to an unstable, risky investment climate.

In summary, Maine State Government, Maine policy makers, and the industries themselves must stop thinking of the Fishing, Farming and Forestry sectors as distinctly different entities, and start thinking and

acting in ways that protect the viability of and promote the growth in Maine's rich natural resource based industry.

II. INTRODUCTION

A. Background of LD 1665 / Resolve 99

During the second regular session of Maine's 119th Legislature, LD 1665, *An Act to Promote Natural Resource-based Industries*, was worked, amended and ultimately, passed into law as Resolve 99 (see Appendix E). In its final form, it put forth four directives:

1. To identify the percentage of business development resources that are being invested in each of these three natural resource based industries (fishing, farming and forestry),
2. To examine the status of labor availability, average age of current workforce, and wages in these industries as well as the existing educational programs aimed directly at supplying labor to the three sectors,
3. To develop a proposal for secondary and post-secondary educational programs to supply labor to the industries under examination, and
4. To identify both barriers to and opportunities for enhancing the growth and sustainability of the State's natural resource based industries.

B. Methodology

In order to provide the Legislature with a comprehensive review of the current status of our natural resource based industries and the educational programs now in place, and to create an economic development strategy for promoting these industries through educational programs and other means, the State Planning Office (SPO) engaged the help and services of several state agencies including the Departments of Labor, Economic Development, Conservation, Agriculture, Education, Inland Fisheries and Wildlife and Marine Resources, the Technical College System, the University System and Maine Maritime Academy.

Despite the fact that fishing, farming and forestry share many characteristics and may well benefit from similar educational and economic development programs, they are distinctly different industries with entirely different groups of stakeholders. Given the fairly tight time frame and the fact that no resources were provided, an Advisory Council was convened.

The Fishing Farming & Forestry Advisory Council has six teams, each charged with performing the necessary research and developing recommendations for their area of expertise:

1. Industry Incentives Research Team
2. Education Research Team
3. Industry Workforce Research Team
4. Fishing Policy Team
5. Farming Policy Team

6. Forestry Policy Team

The methodology employed by the teams varied widely and is fully explained within the text of each section of the report. Generally, the three Policy teams reached out to established stakeholder groups to engage them in this work and to gain the benefit of their vast experience with the specific industry under study. Once the research had been completed, a draft report was circulated to such entities as the Maine Science and Technology Foundation, the Maine Technology Institute and the Natural Resource Sub-Cabinet Committee for review and comment on the draft findings and recommendations.

It should be noted that each section of "chapters" IV, V, and VI was authored by the Advisory Council member with the expertise in that area. (for example, Bill Cassidy wrote the Technical College summary and Jack Lutz wrote the Forestry section). State Economist, Laurie Lachance, authored the Summary and Introductory pieces and edited the entire report. The authors of each section are listed within the body of the report and contact information can be found in Appendix A. The authors welcome your questions and comments.

A full Advisory Council membership and address list can be seen in Appendix A, and the stakeholders who participated in the 3 policy subcommittees are listed in Appendices B-D.

The goal of this effort is to produce a report that will not only provide recommendations on how to promote Maine's natural resource based industries, but will also serve as a great source of information on these industries that have been an integral part of Maine's past and can be a dynamic part of Maine's future.

C. Major Findings

Economic Position

- While employment levels in Fishing, Farming and Forestry have stagnated over the past 30 years, productivity gains have enabled these industries to maintain a significant presence as a creator of wealth and value added.
- Combined, these industries provide 64,000 jobs (8.3% of total) and represent 9.6% (or $3 billion in 1992 $) of the state's Gross State Product.
- Contrary to popular belief, the age data on these three industries do not suggest that there is a lack of new or young entrants into these sectors, and the median age of workers in fishing, farming and forestry, at 33 years, is actually below the state median age.
- There is a wide range of ages across occupations within these industries, from a median age of 20 for nursery workers to age 58 for farm supervisors and age 65 for those engaged in hunting and trapping.
- Given the generational nature of and the large land holdings in agriculture, the greater concern is not the age of the farmers, but whether the elder generation that holds title to the farm has made adequate arrangements to ensure the farm's continuity.

- Average annual wages vary dramatically across occupations, with the paper industry (at $52,543) among the highest in the state, and Agriculture, Forestry and Fishing Services (at $6,750) among the lowest. It should be noted, however, that the latter category is extremely difficult to accurately measure as most workers in this area are single proprietors or partnerships and there are a high proportion of seasonal or part-time jobs.
- The statistics are dominated and driven by the Paper Industry. Yet, once you strip out the 15 large players, the three industries look far more alike than different.
- The economic importance of these industries as measured by direct economic contribution to employment and value added underestimates their importance to Maine's people, economy and culture. These 3 industries create the rural landscape that visitors and natives alike hold so dear. These endeavors directly support Maine's tourism industry and Maine's emerging Retirement Industry. In addition, they serve as a major attractant to college students, entrepreneurs and researchers seeking a high "quality of place".

Current Business Incentives

- Over a recent 12-month period, 80 Federal and State programs distributed nearly $358 million in business development resources to individual firms in Maine in the form of tax breaks, loans, grants, training and technical assistance.
- Of this total, $88 million went to firms in the Forest Products sector, $37 million to agricultural entities and nearly $4 million to the fishing sector.
- It is noteworthy that, while the industries under study comprise only 8% of our job base and under 10% of total value added, they garnered a full 36% of all direct business development resources.
- The relative share of the business development resources that each of the 3 industries received was significantly larger than their relative contribution to Gross State Product, in that the Forestry Sector (which represents 7% of GSP) received 25% of the incentives, the Farming Sector (2% of GSP) received 10% of the development resources, and the Fishing Sector (0.5% GSP) collected 1% of total development offerings in this period.
- Of the $128 million that flows to these industries, nearly half arrives in the form of tax exemptions and incentives and another 40% comes in the form of loans.
- The work of the three policy area subcommittees, detailed in Section IV of this report, identified the critical need for worker training and technical assistance, yet only $2 million (less than 1%) was earmarked for this purpose over the most recent 12 month period.

Educational Offerings

- The State's educational institutions support the Fishing, Farming and Forestry Industries through teaching, research and public service.
- For the K-12 system, the Department of Education supports an "Ag in the Classroom" program that provides teachers with a Food, Land and People curriculum.
- At the secondary level, there are 10 natural resource program areas offered at 24 Applied Technology Centers and Regions across Maine. The State spent $1.1 million last year on these 10

program areas. Of the 7,000 students enrolled in the Applied Technology Centers and Regions, only 350 were enrolled in the natural resource programs.

- Each of the natural resource vocational program areas (such as Agribusiness, Forestry, and Biotechnology) in the Applied Technology Centers and Regions has its own Program Advisory Committee with business people in that particular line of work.
- In the Technical College System, there was an enrollment of 162 FTE in the natural resource programs which are offered at 5 of the 7 campuses.
- The University of Maine's College of Natural Sciences, Forestry, and Agriculture had an enrollment of 1,310 in the fall of 1999, with 807 declaring majors in the 3 areas under study. In addition, there were 229 graduate students studying in these areas.
- In the 1999/2000 school year, $12 million in research grant awards were received by the College of Natural Sciences, Forestry and Agriculture along with $4-5 million by the College of Engineering, the vast majority of which flowed directly to research in Fishing, Farming and Forestry.
- The Cooperative Extension is the primary public service and outreach arm of the University and serves rural Maine with workshops, research, publications and promotion of sustainability in these 3 industry areas.
- An "education ladder" of sorts (bridging the Secondary, Technical College and University Systems) is being created in certain natural resource areas through articulation agreements which allow / enable / encourage students to start their study in a certain field in High School, continue their studies at a Technical College to gain an associate's degree, then, if they choose, acquire a baccalaureate degree at the University. Currently, articulation agreements exist for Agri-Business and Pulp and Paper Technology, with a Biotechnology Agreement near completion.

Opportunities and Barriers

- In addition to Maine's Educational System, this report identifies 3 broad categories of major opportunities for or barriers to further development of these natural resource based industries, namely:
    1. Small Business Support
    2. Access to the Resource
    3. Clear, Stable Public Policy
- Small Business Support: Once the 15 major paper mills are removed from the statistics, the vast majority of the firms in these sectors are very small and, like the greater community of small business in Maine, face a myriad of challenges due to their size including inadequate knowledge of and access to:
    - technical support for business development
    - training and skill development
    - affordable health and other insurances
    - retirement plans
    - development grants, loans, tax programs
- Access to the Resource: These natural resource based industries are under immense pressure from real estate development, making it increasingly difficult to access the very resources (namely the

forests, coastal waterfront, and farmland) they need to continue to operate. Real estate development has:

- reduced the size and viability of woodlots in southern Maine,
- forced fisherman to move their operations back from the waterfront, adding costs,
- made carrying out normal farming and fishing operations (early morning operations, fertilizing, etc.) very contentious, and
- made it far more lucrative for aging farmers and fishermen to sell off farmland and waterfront rather than keeping it in productive use.
- made it difficult to expand into new marine businesses such as aquaculture

- Clear, Stable Public Policy: The lack of clear, stable public policy has weakened the viability of fishing, farming and forestry operations and has muted investment in these natural resource industries. Most notably:
  - Maine's referendum process has delayed, if not stifled, investment in the forest industry.
  - The frequency with which tax incentive programs are altered deters investment.
  - Coastal property does not enjoy the same "current use" tax treatment as farmland and forest land, severely impinging on the viability of working waterfront properties.
  - Right to Farm laws do not currently extend to fishing operations.

D. Overarching Recommendations

A set of overarching recommendations, those which generally apply to all three sectors under study and are believed to provide the best opportunity for keeping Maine's natural resource-based industries viable, are provided below and are organized into the 4 major issue areas highlighted above. (Chapter IV of this report contains industry-specific recommendations)

Education

Elementary and Secondary Education

- ❖ Fully implement the natural resource, entrepreneurship and business education elements of the Maine Learning Results.
- ❖ Promote and expand Maine's "Agriculture In the Classroom" Program to include the other natural resource based industries and to reach more children in both rural and urban communities.
- ❖ Promote and expand the "Economics at Work" tech prep curriculum.

Post secondary Education

- ❖ Create articulation agreements in all areas of natural resource education.
- ❖ Explore ways to expand Extension Education Programs as well as post-secondary educational programs for young people and existing natural resource based proprietors who need training.

Continuing Education

- ❖ Expand and promote educational opportunities for foresters, fishermen and farmers in:
  - Small business education and training (such as FastTrac)
  - Resource management including nutrient management, pesticides, fertilizers, etc., using Best Management Practices (BMPs)
  - Economics
- ❖ Develop a natural resource-based training and exchange program that would bring expert mentors to Maine and allow Maine fishermen, farmers and foresters to travel to other parts of the world to learn production techniques.
- ❖ Improve the marketing and coordination of small business training programs by the State, educational institutions, trade associations and nonprofit groups.

Small Business Support

- ❖ Initiate policies leading to more affordable and accessible health care for Maine's self-employed and micro-businesses.
- ❖ Create consortia across all natural resource industries to purchase insurances of all types.
- ❖ Evaluate existing tax incentive and business development programs to determine how they can be made more accessible to business entities in these 3 industries, so that they can compete more effectively in regional and global markets.
- ❖ Support and expand joint marketing programs, including market research, market development and market promotion, for Maine's agricultural, marine and forest products.
- ❖ Form an interagency food processing working group to address a variety of issues including labor, training and recruiting, tax incentives, market development and permitting.
- ❖ Encourage firms in these sectors and the government agencies which work with these industries to jointly apply for MTI technology grants in an effort to increase the amount of value-added processing.
- ❖ Create a multi-agency "Innovation Team" to expand Maine's capacity for new product development and new processing technologies.

Access to the Resource

- ❖ Extend the current use valuation approach, used in the Tree Growth and the Classified Farmland programs, to include commercial fishing property, and fully fund the municipal reimbursement in all 3 areas to encourage owners to keep rural lands in production.
- ❖ Develop a "Freedom to Fish" policy, modeled on the Right to Farm law, to mitigate waterfront use conflicts and to protect fisherman from nuisance lawsuits.
- ❖ Create a FarmLink network, a data base through which retiring farmers can find a buyer for their farm, and young farmers can be matched with a farm they can afford, or one that offers an apprenticeship or training program for them.
- ❖ Encourage the Maine Farm Bureau, the Small Business Administration, the Department of Agriculture, the Department of Economic and Community Development, and Cooperative Extension to work together in developing outreach programs which deliver business

assistance, Land for Maine's Future grants and FarmLink as an integrated resource package to keep farms in business and to facilitate inter-generational transfers.

- ❖ Close the LURC subdivision loophole that allows 10 lots to be created every 5 years and which acts as a disincentive to keeping forest land in production.
- ❖ Enact a Wildlife Habitat Tax Incentive to encourage landowners to work with the Department of Inland Fisheries and Wildlife to protect significant wildlife habitats.
- ❖ Develop a retirement fund option for farmers, fishermen and wood lot owners, which is linked to the Land for Maine's Future or other land conservation programs, so that they don't have to sell-off their land in order to retire.

Clear, Stable Public Policy

- ❖ Develop a comprehensive natural resource policy statement that supports natural resource based enterprises and provides direction on current and emerging issues, and an implementation strategy that protects and enhances the viability of Maine's rural communities, working landscapes and cultural heritage.
- ❖ Revise the referendum process to require that questions reflect the full range of issues covered by referendum language and to require signature gatherers for statewide issues to obtain signatures in each county in percentages equal to the number of voters in each county.
- ❖ Improve transportation systems (road, rail and port) to lower the cost of transporting forest, marine and agricultural products and continue public funding of critical infrastructure programs such as the Small Harbor Improvement Program (SHIP).
- ❖ Stabilize the terms of the Tree Growth Program to encourage new enrollments and to avoid premature timber liquidation.
- ❖ Leave Maine's workers' compensation reforms alone.
- ❖ Develop a regionally based, coordinated geographic information system to inventory rural resources, to track development patterns which may be threatening the viability of these resources, and to greatly inform the policy making process.

III. MAINE'S NATURAL RESOURCE BASED INDUSTRY

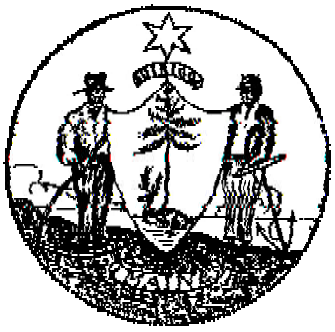
A. History and Heritage

(by Laurie Lachance)

> *"We should realize the fact that Maine is rapidly advancing in prosperity. Consider the manufactures of woolen and cotton goods, of boots and shoes, her lumber, ice, granite, lime, slate and feldspar. The continuous and steady growth of these interests, and the fact that they have withstood business depression and hard times, prove that they are as permanent industries of our State as agriculture itself*."
>
> Ira E. Getchell, "What Products Shall Maine Export?"
> 22nd Annual Report of the Secretary of the Maine Board of Agriculture for the Year 1877

While Mr. Getchell's comment's may seem a bit naive to those of us who have the benefit of understanding the major economic transformation brought about by the completion of the industrial revolution, technological advances, globalization of world markets and the evolution of the knowledge-based economy, his words highlight the legacy of pride in Maine's natural resource base and the life-sustaining industries built on this foundation.

Even a cursory examination of Maine's history clearly illustrates the role that fishing, farming and forestry have played in shaping the persona and heritage of this great state. On June 9th, 1820, the 1st Maine Legislature adopted the Seal and Arms of the State of Maine, described in statute as follows:



"A Shield, argent, charged with a Pine Tree, a Moose-Deer, at the foot of it, recumbent. Supporters; on dexter side, an Husbandman, resting on a scythe; on sinister side, a Seaman, resting on an anchor..."

The resolution went on to offer the following insights into why these particular items were included in Maine's symbols:

The Mast Pine is described as "*the staple of the commerce of Maine*" and "*as the pride of her forests*".

The Moose-Deer "*denotes the extent of unsettled lands, which future years may see as abodes of successive generations of men, whose spirit of independence shall be untamed, as this emblem & whose liberty shall be unstricted as the range of the Moose-Deer*."

And, finally, the resolution goes on to describe the Supporters of the Shield as: *"The Husbandman with scythe represents Agriculture generally & more particularly that of a grazing country; while a Seaman, resting on an anchor represents Commerce & Fisheries; and both indicate, that the State is supported by these primary vocations of its inhabitants.*"

The display of a farmer, a fisherman, the forest, land and sea on Maine's Seal and Arms were an apt choice given that nearly 80% of Maine's workers were employed in these industries at one time. In fact, the US Census of 1840 found a full 71% of Maine workers in Agriculture, 2% in Fishing and 6% in Forestry. Another 15% of Maine workers were employed in shipping, with only 1% characterized in the "learned professions".

By the beginning of the 20th century, the industrial revolution had dramatically altered the composition of Maine's economy. In 1920, only 40% of Maine workers were employed in Fishing, Farming or Forestry. Agricultural employment had experienced the most significant changes, as the percentage of Maine workers employed on farms had plummeted from 71% to 27%. It is interesting to note that, despite the fact that agricultural activity had greatly diminished, Maine still had 48,200 farms, a number which is 8 times larger than the number of farms today. It is also worth mentioning that, whereas only 21% of Maine's women were employed in the early 1900s, by the close of the century, the labor force participation rate of women had grown to 67%.

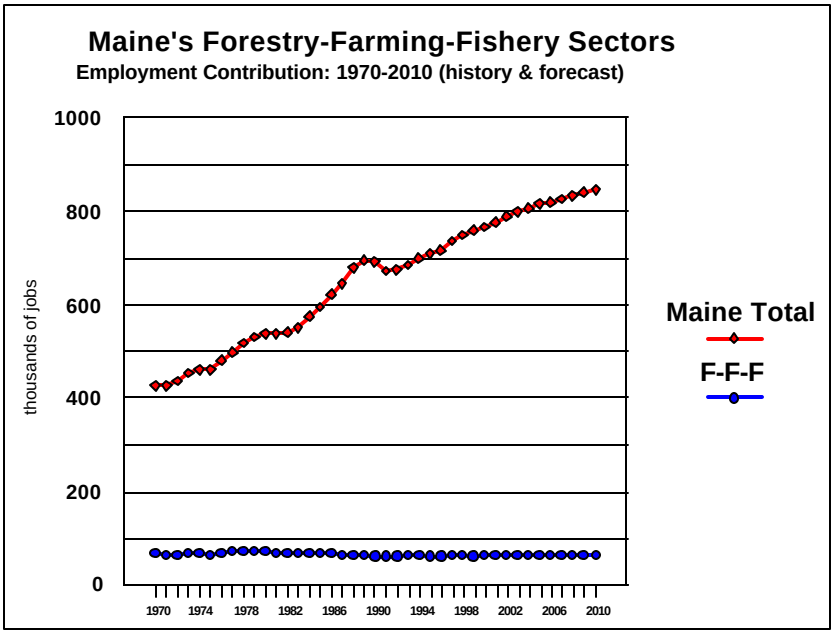
B. Contribution to Maine's Economy and Baseline Forecast

(by Laurie Lachance and Michael Montagna)

As Maine's economy has grown and changed, so too has the role of fishing, farming and forestry in the economic mix. While still foundational in nature, the combined contribution to Maine, as both a provider of jobs and of wealth, has diminished. In the year 2000, it is estimated that nearly 64,000 people are employed in the fishing, farming and forestry sectors, which represents about 8.3% of Maine's total employment base. Together, these natural resource based industries contribute over $3 billion dollars (1992 dollars) to Maine's Gross State Product representing 9.6% of the state's total value-added.

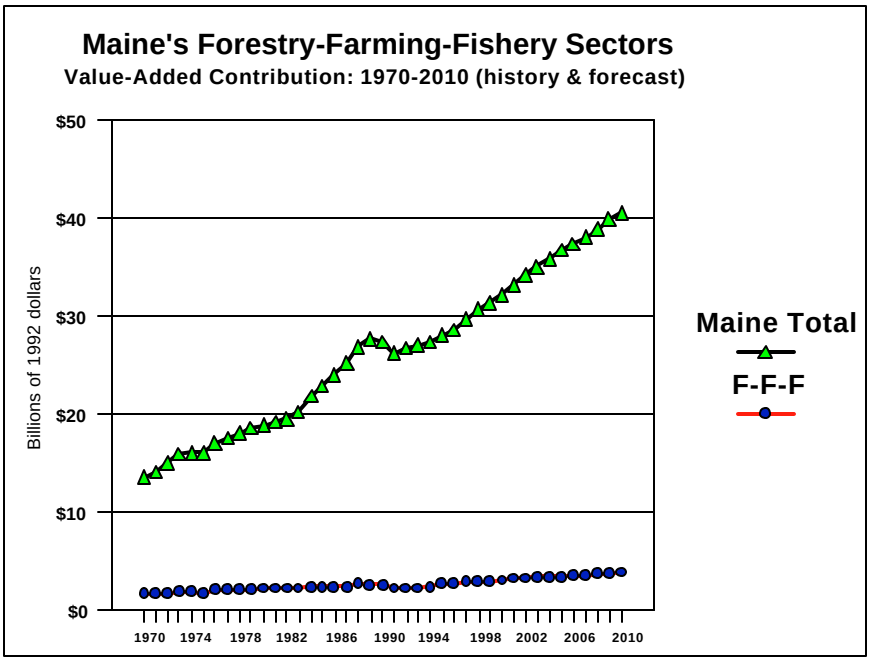
Employment:

As the following graph illustrates, total employment in these 3 industries has been stagnant for three decades, hovering in the vicinity of 65,000-70,000 jobs. Over the same period, Maine's total job base has increased by 80%, from 430,000 to 770,000. As a result, the relative contribution of the industries under study to overall employment has been cut in half. Fishing, Farming and Forestry accounted for nearly 16% of the job base in 1970, as compared to the current level of 8.3%. Throughout the period highlighted below, the forest product sector has provided half of the total natural resource based jobs. Farming contributes another 40%.



Value Added:

Upon examining the trends of value added in these sectors, the story is only slightly different. In real terms, value added in these industries has grown at a respectable annual rate of 2.7 % over the past 30 years. The Maine economy, however, expanded at a 4.6% clip through the same period. (see the graph below) Growth in Forest Product value added outstripped it's sister industries, growing at a 3.3% annual pace, while Fishing averaged 1.8% and Farming 1.3%. The dominance of the Forestry sector should be noted at this point, as fully 73% of the wealth derived from these natural resource based industries comes from the forest products sector. Farming represents 21% and Fishing the remaining 6%.



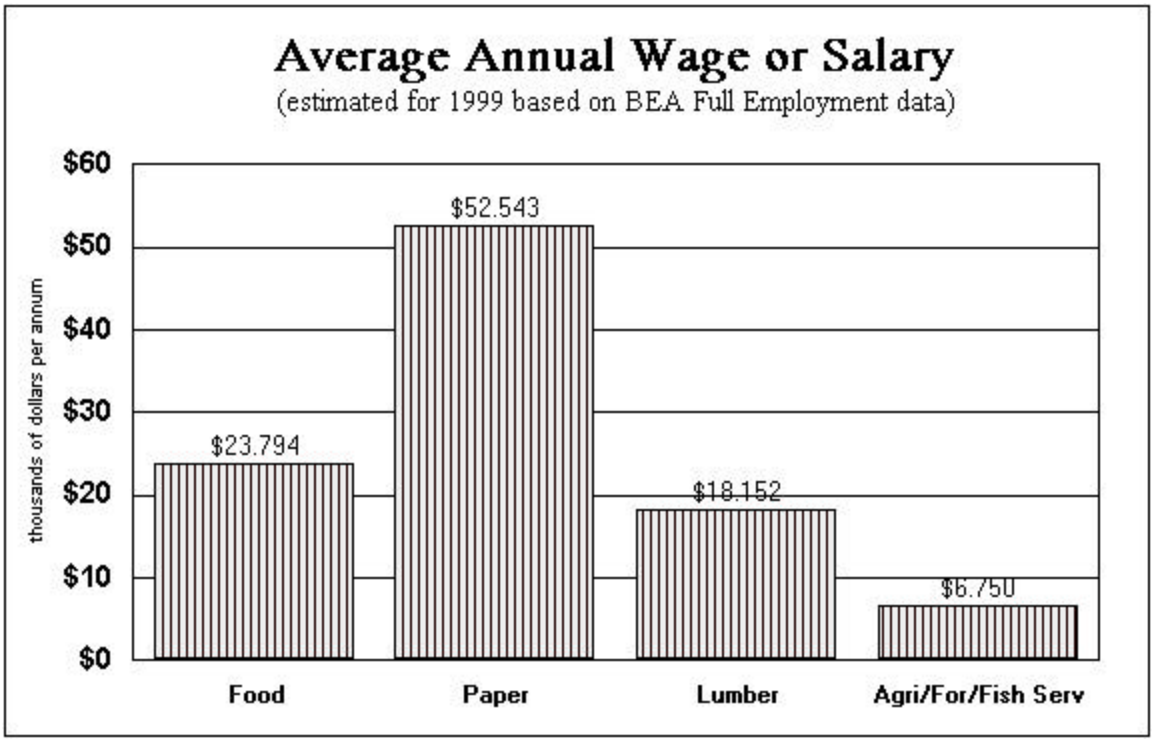
Absent any major policy initiatives, the outlook for these sectors is for a continuation of the trends which Maine has experienced for quite some time. By 2010, it is anticipated that these 3 sectors will add about 2,500 jobs over current levels with nearly half coming in the Farming area. Job growth in agriculture over the past 10 years has been dominated by landscaping activity, which is forecast to continue to power growth in this area going forward. Fishing will also see some increased job activity, while forest jobs expand at the slowest rate.

While the contribution of these 3 industries to Maine's job base will continue to erode slightly, as a producer of wealth, these industries are expected to track overall value added increases and keep the overall contribution to Gross State Product at the 9.5% level.

See Appendix F for the full detail of both employment and value added by industry from 1970-2010.

Comparison of Annual Wage and Salary:

The chart below depicts the relative difference in annual wage/salary rates for the four industries where workers in Maine's fishing, farming and forestry related sectors are categorized.



Viewing the four bars (Food, Paper, Lumber, and Agri/For/Fish Serv) on the chart it is immediately apparent that the paper industry (at $52,543 per annum) is by far the leader in terms of providing income to Maine natural resource sector workers, with the agricultural/forestry/fishery services industry (at $6,750 per annum) ranks as the lowest.

In comparing the wage/salary ranking of these four industries, two factors should be noted:

1. In all cases, the data reflect what is known as the full employment concept. The full employment concept means that every worker, and every dollar of income they earn, are included in computing the average wage/salary that an industry provides regardless of whether workers are seasonal, part-time, or full-time. Thus, an industry that has a heavier concentration of part-time or seasonal workers will have its average wage drawn down compared to an industry that has a higher percentage of full-time workers.
2. Secondly, no data on annual wage for farm workers is provided, since it is not available. The industry labeled Agri/For/Fish Serv includes all Maine people who declare their earnings from

fishing related activities, but in terms of agricultural workers it includes only service workers in industries such as those who provide aerial spraying, veterinary services, and landscaping.

C. Age of Population Working in Natural Resource Industries

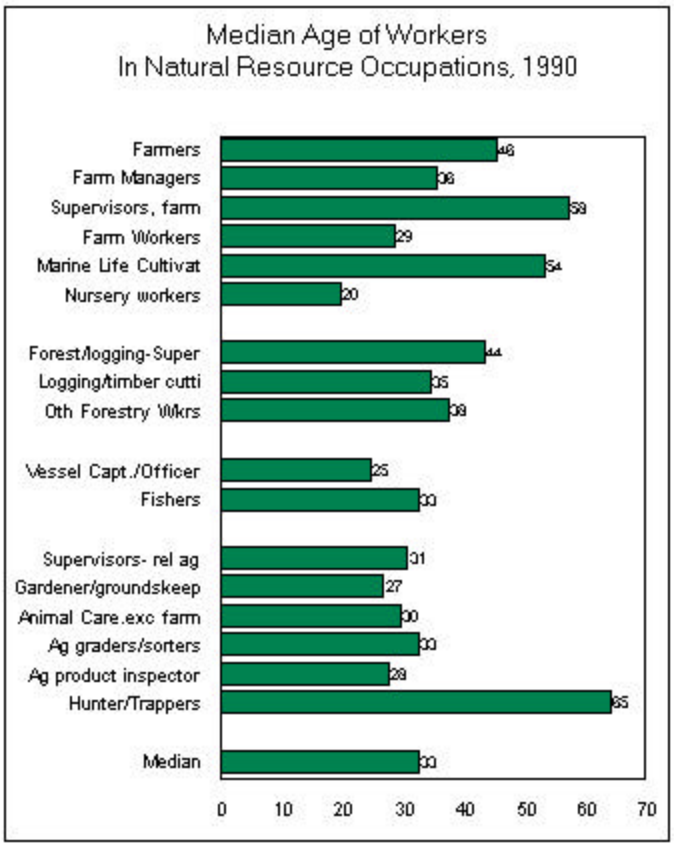
(by Joyce Benson)

LD 1665 requested the State Planning Office provide information on the age of the population working in natural resource industries and occupations. It is widely believed that people engaged in natural resource occupations, especially the owners of such businesses, are older than the average worker or business owner, and thus the industries themselves are at risk from lack of new entrants. Census data shows, however, that the age of individuals involved in these segments of the economy is widely varied from one industry to the next, and among various occupations within the same industry.

The 1990 US Census of Population identified nearly 26,000 people in Maine whose principal occupation is farming, fishing or forestry. Many others work in these fields who hold off-farm jobs or work at other occupations seasonally that are not included in the Census numbers.

Median Age:

For those who reported that their primary occupation was farming, forestry or fishing, for instance, the median age in 1990 was 33, actually younger than the median age of the overall workforce, and ranged from only 20 for nursery workers to age 58 for farm supervisors and age 65 for those engaged in hunting and trapping.



Source: US Census of Population, 1990

Age Distribution:

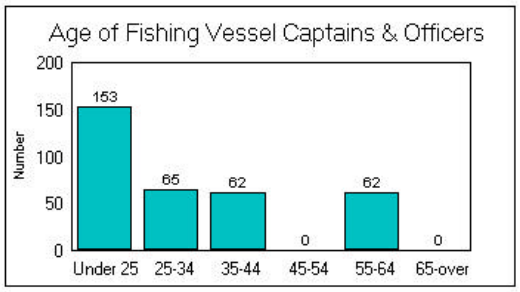
A more clear picture of the age of workers in the natural resources sector of the economy can be gained from looking at the distribution of workers by age within each occupational group.

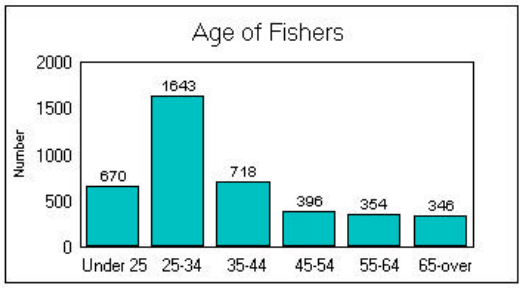
Fishing. The fishing industry has by far the youngest of all workers. Though few in number (the census identified only 342), the median age of a vessel captain or officer in 1999 was only 25 years of age. The median age of the 4,127 crew members working as fishers was only 33 years of age.

Forestry. Loggers likewise are relatively young, half of the 4,288 loggers being under age 35. Supervisors, managers, and others engaged in forestry occupations of a less hazardous or less physically demanding nature, though they total just over 500, tend to cover a wider distribution of ages, and their median age is higher.

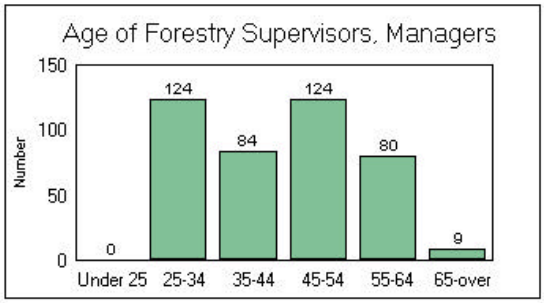
Unfortunately, there is little in additional information about the characteristics of persons engaged in fishing and forestry occupations. The data available for the agricultural sector is somewhat greater.

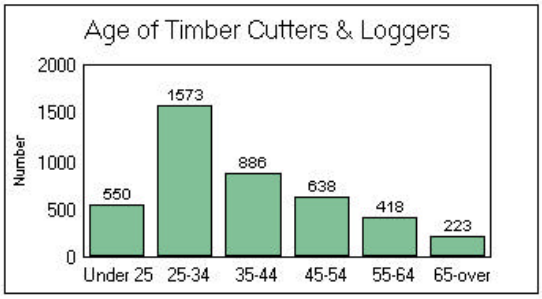
Agricultural Occupations. The decennial Censuses of Population provide the same detailed characteristics of persons engaged in farm-related occupations. In addition, the Censuses of Agriculture, conducted every five years, provide some limited information on the principal owner-operator but unfortunately they provide no information about others engaged in farming and give no insight into the family structure or the roles of the other participants in the farm operation, except to count the number of full and part time farm workers.

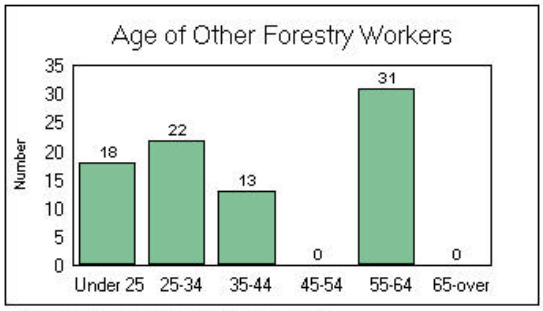




Source: US Census of Population, 1990

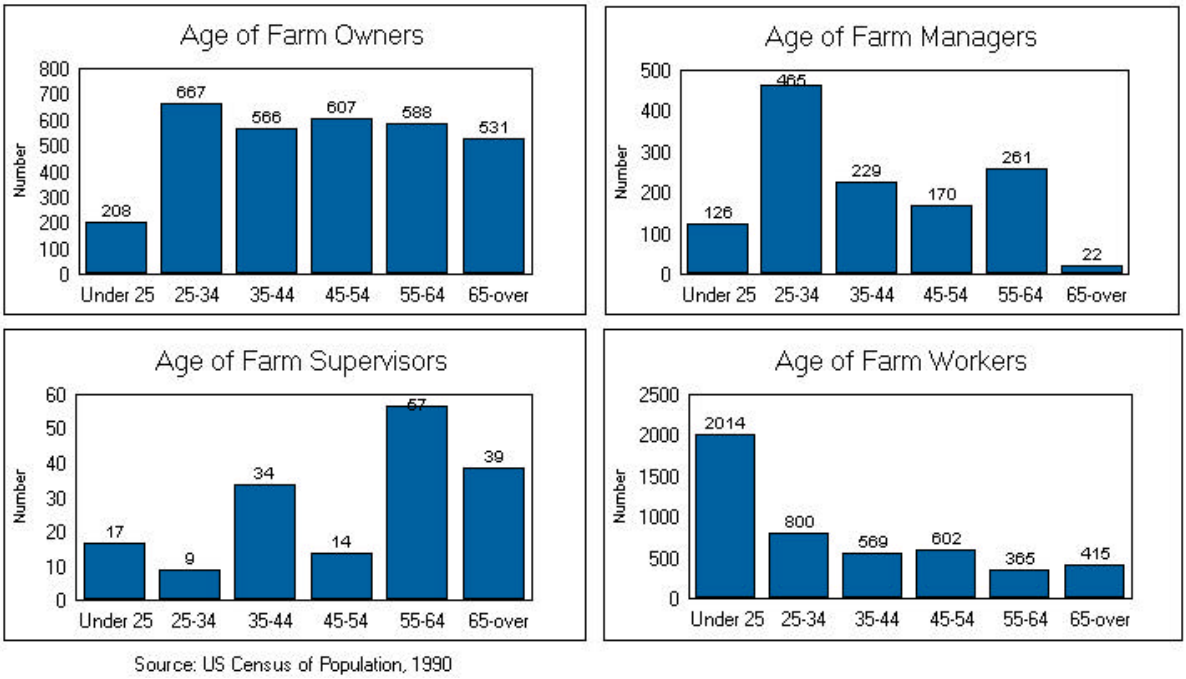






Source: US Census of Population, 1990

Overall, the median age of all 9,375 individuals engaged in on-farm work in 1990 was age 36, roughly comparable to the median age of the Maine workforce. Though there are variations, all of the occupations on farms - owner/operators, managers, supervisors, and farm workers, have workers from all age groups.



Source: US Census of Population, 1990

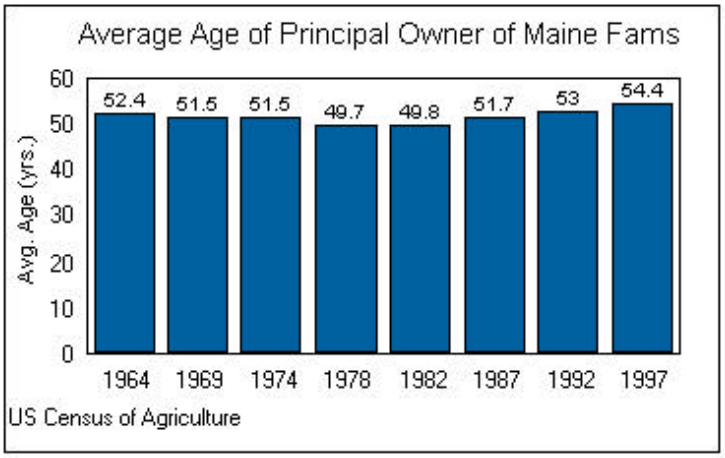
Farmers, i.e., farm owner/operators are nearly evenly distributed over all age groups except there are few under age 25. Of the 3,167 farmers identified in the census, the median age was 46.

Farm managers are, on average, younger than farmers, likely because many of them represent the second generation on the farm, engaged in the farm operation but not yet moved into ownership positions. The median age of the 1,273 farm managers is 36. Farm supervisors represent the other extreme. They were few, only 170, and their median age was 58.

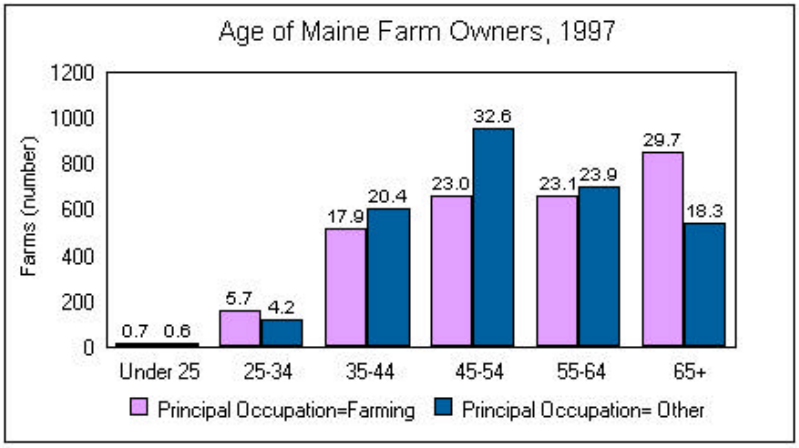
Farm workers are the youngest and largest group. Almost half, 42%, of the 4,765 farm workers are under age 25. Their median age was only 28. Nursery workers, a sub group of 222 farm workers, had a median age of only 20. Farm workers represent a mix of employees on farms that employ workers most of the year (vs. seasonal and migrant labor) and younger generation members, second and often third generation, on family farms.

Though not included in the analysis of on-farm workers, the census counted another 7,049 individuals who work in agricultural occupations that are in non-farm settings, such as gardeners and groundskeepers, animal care workers (animal shelters, etc.), and some graders, sorters and inspectors of farm products. They are comparatively young, with a median age of 29.

The Census of Agriculture has, for several decades, measured the average age of the principal farm owner/operator. The average age should not be confused with the median age, used throughout the above discussion. The average age of 54 reported by the 1997 Agricultural census is a higher number than the median age of 46 for farmers found in 1990, not because people have aged, but because averages are influenced by extreme cases. A few very elderly farm owners included in the total would skew the average age upward. The median age of workers in an occupation is usually a more accurate representation of the industry because it indicates the age at which half are older and half are younger.



In the absence of extreme conditions that create a major upheaval in an industry, the age distribution is usually relatively constant. Since 1964 the average age of farmers has fluctuated little, declining slightly and then starting to rise again in 1987.



Source: US Census of Agriculture, 1997

Given this limitation of the data, it is likely that the pattern of off farm employment and age of the primary owner-operator seen in the Census of Agriculture data is related to farm structure and to farm debt. Older farmers operating small to mid sized farms on average, hold less debt and a higher portion have farmed all their lives. Non-elderly farmers, are more likely to carry higher debt loads and thus they or their spouses seek off farm jobs.

The extent to which farms rely on off-farm income sources has often been viewed as evidence that many Maine farms are noncommercial, or secondary income to many households. However, it is important to note that the pattern of on-farm and off-farm income in farming families is similar to the overall pattern in which two thirds of the households in the larger society have at least two workers. On two thirds of Maine farms, at least one family member holds an outside job. While for a few, farming is secondary, for most who hold off farm jobs, it is a financial necessity, just as it is for non farm families to have two incomes. The farm population merely reflects the norm.

Age of Owners (vs. Age of Workers)**:**

Those engaged in natural resource industries include all age groups, and in many cases reflect a younger rather than older population of workers. Age data does not suggest these industries to be lacking in new or young entrants. In spite of this, there is evidence that these businesses, especially farms, tend to be generational, and it is traditional that the eldest generation holds title to the farm, with other family members engaged either full or part time in the operation of the business. The data does clearly show that farm owner/operators are older than managers or farm workers.

Therefore the greater concern is not the age of the farmers, but whether the elder generation that holds title to the farm has made adequate arrangements to ensure the farm's continuity. A corollary concern is that when times are tough in any industry, fewer family members are likely to want to carry on the family business or are financially able to do so. Because these industries have typically been struggling economically and make great demands on those who choose them (physically challenging, require long hours, etc.), exit levels are high. The number of farms in which the next generation either does not exist, or is not interested in continuing the business, should be of concern.

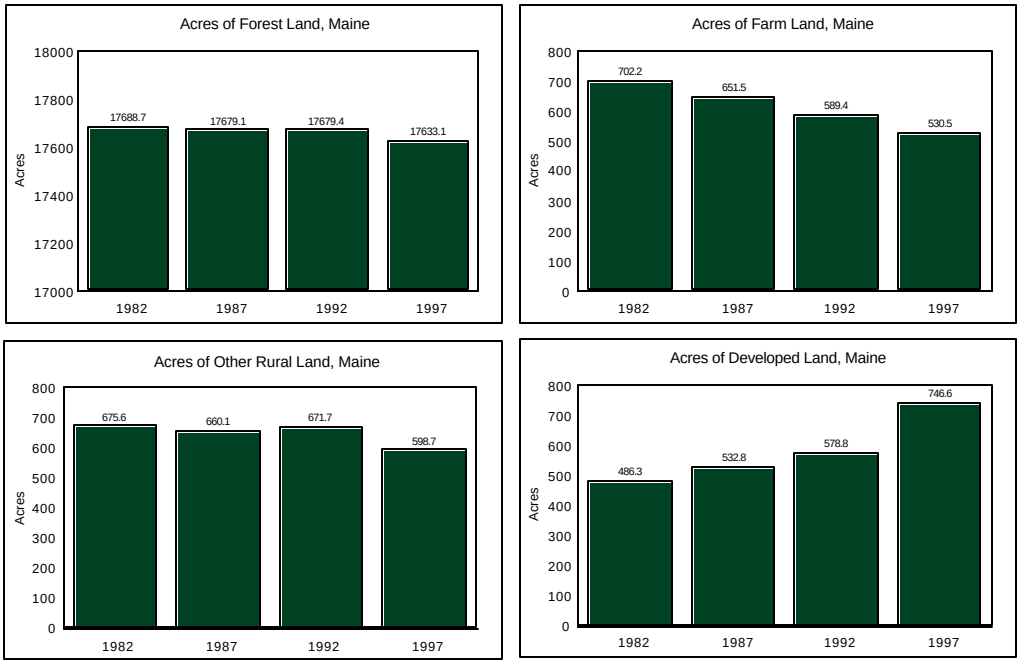
D. Fragility of the Resource Base for Natural Resource Industries

(by Joyce Benson)

The land base that supports Maine's natural resource industries is at risk. Those who earn their living from the land face must deal with a dwindling resource base, development pressures, a struggle to maintain productivity and environmental quality, and political uncertainties. There is a tremendous sense of uncertainty, often referred to as the "impermanence syndrome", about their future on the land. It is the result of an ever present concern that the land they farm, the forests they rely on, or the shorefront they need will no longer be available to them or that changing environmental regulations or public referenda will severely limit their capacity to manage the resource in a manner that will enable them to eke out a living from it.

1. Development Pressure

The USDA National Resources Inventory (NRI), conducted every 5 years, shows an acceleration of the pace at which nonfederal land is being developed. In Maine, between 1992 and 1997, the inventory found that 168,000 acres were converted in the 5-year period. An average of 33,560 acres of land had been converted to development uses each year, compared to an annual average of just over 9,000 acres per year during the previous 10 years. Rural land of all types is being lost to other uses. Maine has 56,000 fewer acres in forests than it had in 1982. There are 102,000 fewer acres of cropland and 99,000 fewer acres of pasture, and 77,000 fewer acres of other rural lands. <u>In all, Maine has lost 304,000 acres of rural land since 1982, 260,000 of it to development</u>.

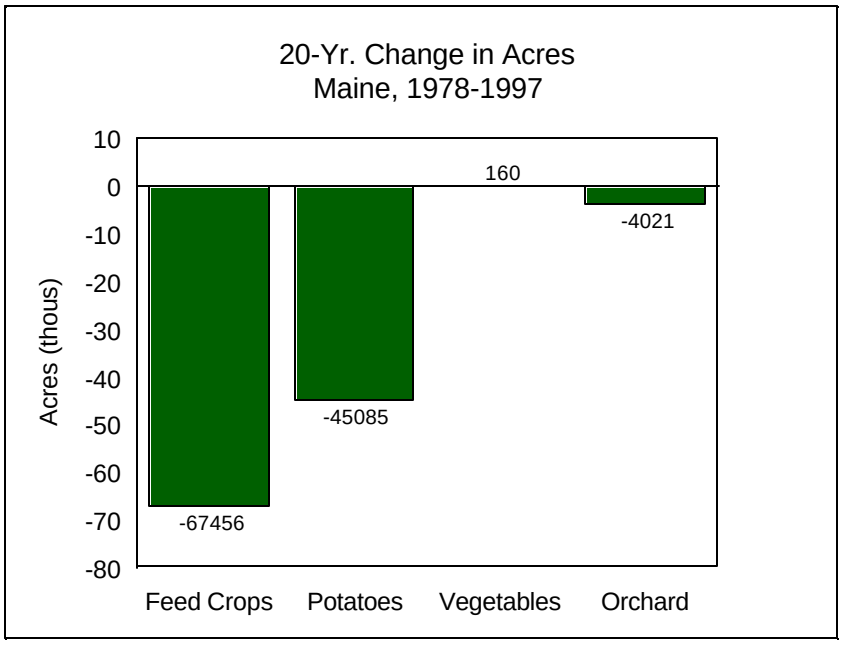


The ongoing study of sprawl at the State Planning Office (SPO) has tracked development patterns in Maine and found that in the 1960s and 70s the highest rates of suburban style growth was in southern Maine or in towns immediately bordering Maine's largest urban centers. But by the end of the 1980s and through the 1990s, growth had shifted to smaller more resource-based rural towns further inland and further north. As development moves outward, the portion of rural land that is consumed can only accelerate.

2. Farmland Loss

Wooded lots and farmland have been prime targets for single family housing since the 1970s. A survey of applications to Department of Environmental Protection (DEP) under the Site Location Act (conducted as part of a larger study of farmland conversion in Maine in the early 1980s by SPO and University of Maine at Farmington) found that farmland was also prime for larger developments because it is cleared and usually has the characteristics desirable by developers, i.e., it is well drained and relatively flat, making it more economical to develop. Losses of farmland have been well documented through censuses and case studies. Since 1982, the amount of land in farms in Maine has dwindled from 1.5 million acres to 1.3 million. Acres of cropland have declined from 611,000 to 540,000. Conversion along Maine's coastline, however, is somewhat unique. Rather than the conversion of productive land into development uses, the uses typically associated with the fishing industry (docks, landings, marine services, fish processing facilities, etc.) have faced extreme pressure from growing demand for shorefront property for upscale homes, resorts, docking for private recreational boats, and the like.

Though farmland of all types is at risk to economic losses and crop disasters that cause farms to go out of business (hence declines in potato acreage and in orchards), certain types of farmland are at greater risk of development than others. Most recently, orchards have come to be seen as attractive sites for developing upscale subdivisions. Over the past two decades hayfields and pastureland has declined at a much faster pace than other kinds of farm uses. The NRI shows that over half (54.7%) of the pasture land in Maine has been lost between 1982 and 1987; and, in addition, the 1997 Census of Agriculture shows that cropland (not pasture) used to produce livestock feed (primarily hay) has declined by nearly 70,000 acres.



3. Forest Land Loss

The amount of forest land in Maine has increased throughout much of the century, primarily a result of abandonment of farms, especially in more remote areas of the state. However, the character of forest land began to change in the 1960s. USDA surveys since 1959 have shown although the total acres in forest cover rose by nearly a quarter million acres, the amount actually available for timber use has declined. The amount of forested land held for non-timber use has reduced the amount of land held for timber production from 98.5% of all forest land to 95.8%.

Suburbanization is the primary contributor to this trend. With the acceleration of suburbanization during the 1970s the attractiveness of "secluded" home sites cut deep into the small wood lots in towns near the State's urban centers. Land use planning tools widely engaged over the past two decades in an attempt to "maintain the rural character" of fast growing towns, such as large lot zoning, have led to the division of woodlands (and of farmland as well) into lots no longer manageable for timber production.

Today over 3.7 million acres of forested land in the organized towns is enrolled in the Tree Growth Taxation Program and another 75,000 acres are on farms enrolled in the Farmland Taxation program, giving signal that the owners of these lands intend to maintain them as wood lots. Though the enrolled land amounts to a third of the land area in organized territories in Maine, it represents less than half of the acres of forest land in the organized area.

4. Loss of Coastal Access

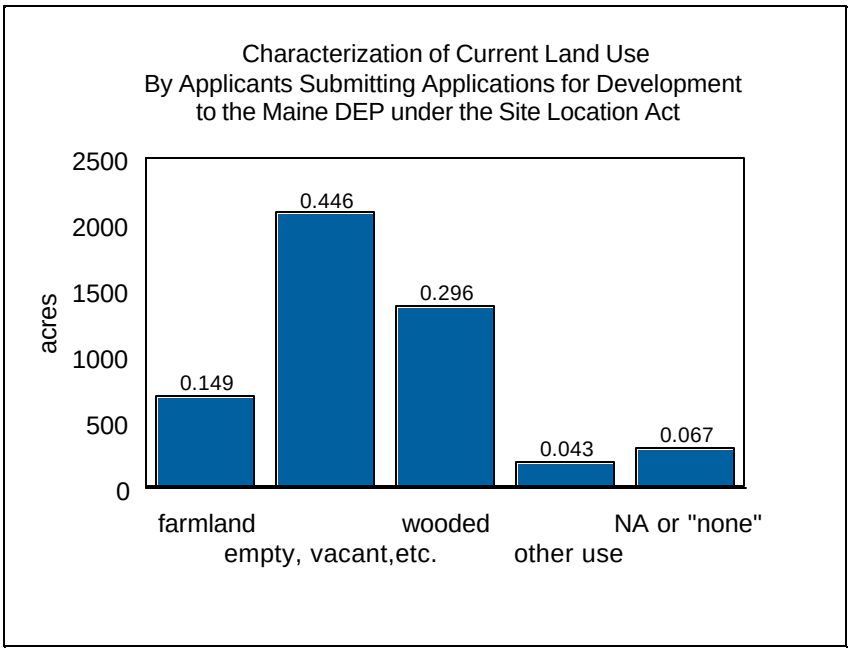
Maine's coast is also under extreme pressure from development, though, because of its unique nature it is not included in the NRI. One measure of pressure is land values. Land values in towns in the coastal zone (which also includes towns on tidal portions of Maine's rivers) rose almost twice as fast as in non-coastal towns between 1994 and 1998, increasing by 11.3% compared to 6.6% in other towns.

5. Key Contributing Factors

Three factors have had a profound influence on how land is developed in Maine. They are the lack of public understanding of the value of rural land uses, public expectations and ownership patterns.

a. Public Perceptions

The greatest cause of loss of farmland and forest land is the lack of public perception of the land as productive land. Lack of understanding of farming and the role of land plays has a big role in the kind of farmland that is being converted. When the public sees a cow, a chicken, or a herd of sheep, they perceive them to be part of a farming activity. Most understand that they contribute milk, eggs, meat, wool, etc. to our food supply. When the public sees an orchard or a field of tomatoes or corn they perceive that as land being farmed. But a field of hay is simply viewed as "vacant", "unused", "empty". Wooded acres are simply "unused". A Study of Farmland Conversion in Nineteen Maine Communities conducted by SPO and the University of Maine, Farmington in 1982 included a review of applications made under the Site Location Act. An overwhelming proportion of the parcels that were open farmland and many in forest were identified by the applicants as empty, vacant, abandoned, with no use, or in similar terms. The necessity of those fields to feed livestock is not understood. In regions of Maine today there is an inadequate supply of productive hay and forage land to ensure the growth and future of livestock farming.



b. Public Expectations and Demands on Land Owners

Not only is land being converted to other uses because it is not perceived as vital to the natural resource sector of Maine's economy, it is also being lost because public perceptions of how farming, logging, or fishing "ought" to be carried out. Though the public likes the scenic views offered by farms, woodlands and coastal fishing villages, many object to the noise, odors, and industry practices necessary to operating viable farms, logging operations or fishing ports.

In response, Maine (and nearly all other states) has adopted Right to Farm legislation that prohibits nuisance suits of a frivolous nature against farm operations. However, in the absence of good land use planning, farmers are constantly faced with new homes built next to their cropland, wells drilled too close, and new neighbors who find that their scenic view is accompanied by the smell of manure, and the sounds of tractors, irrigation pumps, compressors and other noises through the night, and while suits are few, the constant conflict is real. An attempt to establish a setback, under the Farmland Registration Act, was unsuccessful because it met severe public opposition, especially from the development community and municipalities fearing that setbacks would limit their tax base by decreasing the amount of developable land.

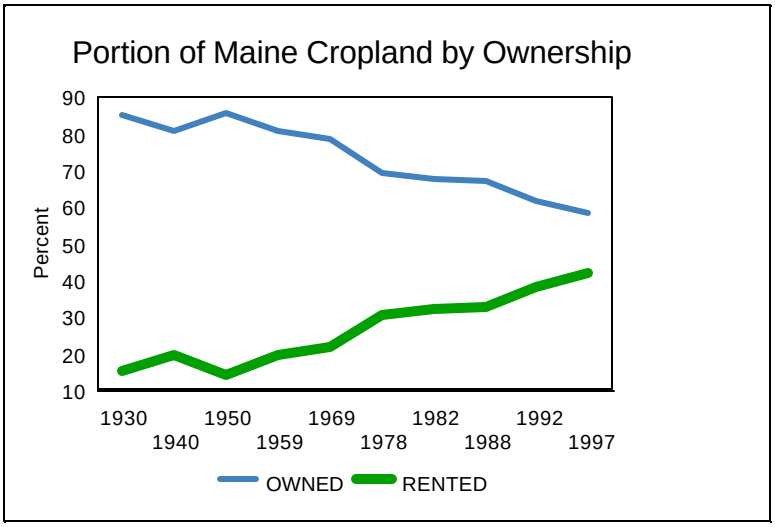
Fishermen face a similar problem in that they are crowded off the coast or restricted in access to the least desirable locations by upscale

developments that no longer want the noises or odors associated with landing their catch. For the forest industry, one of the largest problems to managing woodlots in southern Maine is "development shadow", i.e., people don't like to see trees cut on property near their home. An even greater reflection of this has been the repeated referenda to ban certain kinds of forest practices and to regulate others.

c. Ownership Patterns

Maine's land area in the organized portion of the State is largely held by small land owners. Who owns Maine's land is central to how it will be developed or the degree to which it is at risk of being lost from the resource base. More than one third of the land farmed today is not owned by the farmer who farms it. The share rented from others has risen steadily over the past several decades, placing the future of agriculture in Maine at greater and greater risk.

A USDA study of who owns the farmland shows that in Maine most owners (non-farm) are people who have left farming but retained the land. Many are retired farmers with limited income and limited resources to enable them to hold onto the land. While preferential taxation programs such as Farm and Open Space and the Tree Growth program have reduced the burden of holding onto the land, they do not compensate for insufficient retirement income or rising medical costs that often force older land owners to sell their land for development.



IV. CURRENT INCENTIVES FOR NATURAL RESOURCE INDUSTRY DEVELOPMENT

(by Richard Sherwood)

A. Overview

Eighty Federal and State programs distributed nearly $358 million in business development resources to individual firms over a recent twelve month period. Twenty-eight of the eighty programs loaned the firms money, another twenty-two insured, guaranteed or arranged third party loans to the firms, twelve programs reduced the taxes paid by selected businesses, ten programs made direct monetary grants to the firms, five provided technical assistance and three provided worker training.

Almost 36% of the $358 million went to firms in the natural resource sectors – 10% to the agriculture sector, 1% to the fishing and aquaculture sector and 25% to the forest products sector.

In addition to these development resources, the State budget allocates another $45 million a year (less than 3% of its General Fund Budget) to the natural resource agencies – 42% to the Department of Agriculture, the Dairy Council and the Milk and Blueberry Commissions; 31% to the Department of Marine Resources and 27% to the Maine Forest Service.

B. Study Design for Inventory of Business Development Resources

The Industry Incentives Team is indebted to the Federal, State and regional agencies who provided the financial data for this report.

The Team's work divided naturally into three phases. Step one formulated an operational definition of a business development program. Step two identified Federal and State agencies with business development programs conforming to the operational definition and compiled a preliminary list of such programs. Step three asked the agencies identified in step two to correct errors or oversights in the program lists and report the annual value of the development resources distributed to businesses.

Two facets of the study appeared particularly problematic beforehand.

The first was asking agencies to report their allocation of business development resources using categories different than the ones they ordinarily employ in their record keeping. The study divides Maine businesses into four categories – 1) businesses growing, harvesting or processing products from Maine farms, 2) businesses growing, harvesting or processing products from Maine coastal waters, 3) businesses growing, harvesting or processing products from Maine forests and 4) all other Maine businesses. These groupings, which combine dairy farmers with potato chip manufacturers and salmon hatcheries with packing plants, are not the sort agencies ordinarily use to track applicants for and recipients of assistance. As a result, researchers couldn't be sure agency records would allow the agencies to group their business investments according to the study categories. We addressed this potential problem in two ways. First, expecting that many agencies would track recipients using codes from either the Standard Industrial or the new North American Industrial classification systems, we

provided lists matching the study categories with the two classification systems. This allowed agencies using either classification system to report the precise distribution of resources among the study categories. Second, we asked agencies whose record keeping systems could not be reconciled with the study categories to estimate, as best they could, the amount allocated to each sector.

The second facet of the study which seemed likely to be especially problematic was obtaining statistical data for the same time interval from every agency. We knew from experience that agencies frequently have difficulty providing information for a specific, arbitrarily defined interval. If, for example, we had asked in the fall of 2000 for fiscal year 2000 data; some agencies would not yet have received their final 2000 information. If, on the other hand, we had asked for fiscal year 1999 data; some agencies would have already archived the information and found it difficult to retrieve. These problems are compounded by the fact that Federal and State agencies operate on different fiscal years. Our solution was to ask each agency to answer our questions using the most recent twelve months of data it had available rather than asking it to provide the information for a specific calendar interval.

Step one formulated the following operational definition of a business development program: "government funding or services which (1) enhance the profitability or survivability of individual businesses, (2) require formal application for program participation and (3) have explicit criteria for determining benefits." This definition excluded resources provided to businesses for other purposes such as fishing boat buyouts and disaster relief. (An exception was made for Federal ice storm funds because some were, in fact, used for development.) The definition also excluded resources like tourism promotion and "Milk is good" campaigns which advance entire industries rather than individual firms. Finally, of course, the definition excluded resources originating from private and nonprofit organizations.

Step two listed the Federal and State agencies which were known to have or thought likely to have business development programs and reviewed the agencies' world wide web sites to identify all such programs by name.

Step three addressed a letter to every agency identified in step two, explaining the purpose of the study and supplying the operational definition of a business development program formulated in step one. Listing the business development programs from the agency's web site, the letter asked the agency to review the list and add to it or subtract from it as necessary. This served as a memory prompt to minimize the chance of the agency overlooking any programs and as a check on the Industry Incentive Team's judgment of which agency activities met the operational definition of business development. The letter set out both the Standard Industrial Classification system codes and the North American Industrial Classification system codes for each of the three natural resource study categories. This provided the agency guidance in how to group resource recipients by category. Finally, the letter asked the agency to review the most recent twelve months of financial data available and report the resources it had supplied to businesses in each of the three natural resource categories plus the amount it had supplied to businesses in the remainder of the economy. The letter provided guidance on how to quantify the different types of resources. For example, it directed the agency to record the entire principal for direct

loans, but only those portions of principal for which the agency was liable when reporting insured or guaranteed loans. Similar guidance was provided for the other types of resources.

Using these procedures, we were able to obtain information from every agency.

C. Government Business Development Resources Provided to Maine Firms

The tax exemptions and incentives in Table 1 represent the tax savings to the businesses. The monetary grants represent cash awards the recipients do not have to pay back. The values shown for direct loans represent the principal borrowed. The amounts for insured, guaranteed and arranged loans are either those portions of the principal for which the insuring or guaranteeing agencies are liable or else the principal amounts arranged with the third party creditors. The values for technical assistance and worker training are the costs to agencies of offering the services -- largely the personnel costs of the staff providing advice or training for individual businesses.

See Appendix G for a list of the business development programs surveyed.

The reader should not interpret the data in Table 1 as actual, "budget" figures for a specific year. He or she should, instead, view the numbers as estimates of the approximate value of the resources delivered to firms over a typical twelve month span. (See paragraphs four and five in the methodology section above.)

Table 1

Dollar Value of Business Development Resources Provided Annually to Selected Sectors of the Maine Economy						
	Provided to Natural Resource Sectors				Provided to All Other Sectors	Grand Total Provided to All Sectors
	Agriculture and Processing of Maine Agricultural Products	Fishing, Aqua Culture and Seafood Preparation & Packing	Forestry, Logging, Wood & Paper Product Manufacturing	Total Provided to Natural Resource Sectors		
Tax Exemptions and Incentives	$14,750,000	$1,670,000	$42,430,000	$58,670,000	$91,990,000	$150,660,000
Monetary Grants	$4,430,000	$520,000	$1,070,000	$6,030,000	$3,370,000	$9,400,000
Direct Loans	$7,090,000	$760,000	$41,790,000	$49,630,000	$72,000,000	$121,640,000
Insured, Guaranteed and Arranged Loans	$9,700,000	$720,000	$1,350,000	$11,770,000	$55,620,000	$67,390,000
Technical Assistance	$130,000	$130,000	$560,000	$820,000	$4,580,000	$5,400,000
Worker Training	$760,000	$20,000	$520,000	$1,290,000	$1,990,000	$3,270,000
Totals	$36,680,000	$3,820,000	$87,720,000	$128,210,000	$229,550,000	$357,760,000

Individual cell values may not sum to subtotals and totals because of rounding error.

Table 2

Percent of Business Development Resources Provided Annually to Selected Sectors of the Maine Economy						
	Provided to Natural Resource Sectors				Provided to All Other Sectors	Grand Total Provided to All Sectors
	Agriculture and Processing of Maine Agricultural Products	Fishing, Aqua Culture and Seafood Preparation & Packing	Forestry, Logging, Wood & Paper Product Manufacturing	Total Provided to Natural Resource Sectors		
Tax Exemptions and Incentives	9.7%	1.1%	28.2%	38.9%	61.1%	100.0%
Monetary Grants	47.1%	5.5%	11.4%	64.1%	35.9%	100.0%
Direct Loans	5.8%	0.6%	34.4%	40.8%	59.2%	100.0%
Insured, Guaranteed and Arranged Loans	14.4%	1.1%	2.0%	17.5%	82.5%	100.0%
Technical Assistance	2.4%	2.4%	10.4%	15.2%	84.8%	100.0%
Worker Training	23.2%	0.6%	15.9%	39.4%	60.9%	100.0%
Totals	10.3%	1.1%	24.5%	35.8%	64.2%	100.0%

Individual cell values may not sum to subtotals and totals because of rounding error.

V. SECONDARY AND POST-SECONDARY EDUCATIONAL PROGRAMS/TRAINING

There are many educational opportunities available in the natural resource area at the high school, technical college and university levels. There are several courses and programs located throughout the state at all three levels of education. Generally they have been designed to reflect the economic needs of the area, especially at the high school and technical college level. Programs related to fishing such as aquaculture, marine technology and boat building are located along the coast; agriculture-related programs are in Aroostook County primarily although horticulture and natural resource programs are located throughout the state; and forestry programs are located in northern and western Maine.

The University of Maine System provides service to forestry, farming and fishing in many areas of the state also. The University of Maine leads the system in providing the resources and opportunities for study in these natural resource areas. The research component of many of the campuses of the System focuses on these three industries. The College of Natural Resources, Forestry, and Agriculture alone received more than $12 million in the 1999-2000 fiscal year. Almost all of that money was committed to research in forestry, farming and fishing. The College of Engineering supported additional research for these three areas with part of an additional $4-5 million in resource grants.

Enrollments in natural resource-based programs vary according to the type of program and level of educational offering. About 450 students are enrolled in programs at the high school level. The Technical Colleges had an enrollment in associate degree and certificate programs at five of the seven campuses of 162 full time equivalent students in the fall of 1999 and had 83 graduates in the spring of 2000. (Central Maine and York County Technical College do not have programs that are industry-specific.) The University of Maine's College of Natural Sciences, Forestry and Agriculture had an enrollment of 1,310 in the fall of 1999 with 807 of those students declaring majors related to fishing, farming and forestry. An additional 229 graduate students are studying in these majors.

The Cooperative Extension at the University of Maine serves the natural resource-based industries in a variety of ways including workshops, research, publications and the promotion of sustainability for those industries.

In addition to the industry specific programs and courses, all of the educational institutions offer courses and programs that support the natural resources. These programs include computer technology, business, and marketing.

The Ag in the Classroom program is offered in grades K-12 to give all students an opportunity to understand where food and fiber comes from and how it is produced. The Food, Land and People curriculum offers classroom teachers activities they can incorporate into their courses to further this understanding. Both of these programs need to be expanded to afford more students and teachers these opportunities.

There are three natural resource related programs of study that have made huge inroads in articulating courses of study among educational institutions. The goal was the development of criteria for course content, skill levels and academic achievement that, when met, would allow a student to begin a course of study in a specific program area at the high school level and complete a certificate and/or an associate degree at a technical college and/or a baccalaureate degree at the University of Maine without having to repeat courses. Each institution would accept the credits of the others.

Currently a high school student enrolled in Agri-Business or Pulp and Paper Technology can obtain a baccalaureate degree by following the prescribed course outline and maintaining a passing grade. A student enrolled in Biotechnology at the high school level can complete an associate degree through the technical college system. The agreement between the technical college and university has not been completed yet. Once that is done, the student can complete a baccalaureate as described above. This type of program to program articulation will promote postsecondary education, reduce costs and encourage increased student participation in higher education.

Maine's public educational institutions provide support to fishing, farming and forestry through teaching, research and public service. They are important to the sustainability of this vital sector of the Maine economy.

A. Maine's Applied Technology Centers and Regions

(by Yvonne Davis)

All Maine students who are eligible to receive a free public secondary education are afforded the opportunity to attend vocational education programs in the area where they reside. These programs are available at the state's twenty-seven applied technology centers and regions. There are nineteen centers and eight regions located across the state from Aroostook county in the north to York County in the south, and from Oxford County in the west to Washington County in the east.

The major difference between the centers and regions is their governing structures. Each center is governed by a single school administrative unit while regions are governed by cooperative boards comprised of representatives of the districts they serve. In both cases the schools serve students from the several school units with which they are affiliated.

The program offerings at the centers and regions are identified by Classification of Instructional Program codes (CIP codes) which are U. S. Department of Labor codes and are recognized nationally. Currently the applied technology centers and regions are collaborating on a process of cross-walking their vocational programs with the Maine Learning Results and they are benchmarking these programs to national skill standards. Once this project is completed Maine will have its own standards for each program area.

Each vocational program has a Program Advisory Committee comprised of business people in that particular line of work. This committee advises the instructor regarding the skill sets needed for

successful entry into the labor market for that field. Members also assist with employment of graduating students, equipment donations and, often, student mentoring.

There are ten natural resource program areas offered at twenty-four applied technology centers and regions across the state:

- **Agribusiness**
  Caribou
  Presque Isle

- **Farm Mechanics**
  Presque Isle
  Lincoln

- **Horticulture**
  Dexter
  Portland
  Presque Isle
  Sanford
  Rockland
  Brunswick (new)

- **Forestry**
  Farmington
  Houlton
  Lincoln
  Rumford
  Norway

- **Natural Resources**
  Skowhegan
  Belfast

- **Aquaculture**
  Presque Isle
  Lubec

- **Boat Building**
  Ellsworth (This program closed in 2000)

- **Marine Occupations**
  East Machias

- **Marine Technology**
  Rockland

- **Biotechnology**
  Augusta
  Biddeford

These natural resource programs are offered at the high school level. The average enrollment in these programs is approximately 350 out of a total enrollment in vocational programs of about 7,000. This includes both juniors and seniors. There are a few schools in Aroostook County which offer agricultural programs that are not vocational programs. This accounts for an enrollment of 440 students in FFA.

The State of Maine provided $1,116,800 in funding for the natural resource programs listed above during the '98-'99 school year. That amount breaks down as follows:

Agribusiness	$295,440
Farm Mechanics	$102,158
Horticulture	$129,839
Forestry	$302,669
Natural Resources	$ 44,168 (estimate)
Boat Building	$ 40,143
Marine Occupations	$ 94,701
Marine Technology	$ 53,416
Biotechnology	$ 46,782
Aquaculture	$ 29,566 (for Lubec, Presque Isle costs included in Agribusiness)

There are additional dollars to support the FFA program, both state and nationally.

B. Maine Technical College System

(by William Cassidy)

The Maine Technical College System is a statewide, two-year public college system comprised of seven colleges and eight off-campus centers. The colleges serve more than 5,500 degree students each year in one- and two-year programs, and 15,000 students each year in credit and non-credit courses. The mission of Maine's Technical Colleges is to meet the occupational and educational needs of Maine's workforce and to support economic development.

Maine's Technical Colleges offer more than 190 programs in areas such as allied health and nursing, automotive technology, business, information technology, graphics/multimedia, construction, early childhood education, electrical/electronics, engineering technology, heating, plumbing, air conditioning, culinary arts, marine resources, environmental technology, metals fabrication/manufacturing, and public and occupational safety. Since 1999, the colleges have offered a general studies degree designed to transfer to four-year colleges and universities.

In addition, the Maine's Technical Colleges offer customized training for business and industry, as well as training for expanding companies through the Maine Quality Centers program. The colleges also offer a career internship program, Maine Career Advantage.

MTCS Natural Resources Programs

The agribusiness, forestry, and marine resources industries have long been vital to Maine's economy. Technical College programs are designed to reflect and support the employment needs of their region. For example, Washington County Technical College, with campuses in Calais and Eastport, has played an important role in preparing workers for careers in the marine industry. In addition to traditional fields within the natural resources industry - such as pulp and paper - the Technical Colleges also offer career opportunities in new and emerging fields such as mariculture and bioscience.

Currently, the Technical Colleges offer the following one- and two-year programs directly related to the natural resources industry: pulp and paper technology, bioscience, agribusiness administration, applied marine biology and oceanography, environmental technology, plant and soil technology, pollution abatement technology, aquaculture / mariculture, marine technology, small craft design, wooden boatbuilding, marine composites, and marine mechanics.

The attached map shows the location of the colleges' current program offerings in the natural resources industry. A table containing an overview of the types of programs, recent graduation numbers, full-time equivalent enrollment, and a brief program descriptor is also provided. The Technical Colleges offer, on a regular basis, a variety of industry-related courses and workshops.

In addition to the above industry-specific programs and courses, the colleges offer a wide variety of programs that support the natural resources industry. For example, students graduating from a computer-aided design program may apply their skills towards designing high-tech marine crafts. Computer technology, marketing, accounting, and business program graduates help to ensure that natural resources related businesses operate effectively and efficiently.

Agribusiness & Forestry		
Program Title	**Program Type**	**Graduates & Full-Time Equivalents**
Pulp & Paper Technology	Associate/ Certificate	June 2000 Graduates: 49 June 1999 Graduates: 64 Fall 2000 FTE: 28 Fall 1999 FTE: 45
Program Descriptor: Many pulp and paper companies now consider the Certificate as a minimum, basic level of technical training required to be considered for workforce employment. Graduates from the Associate Degree program may not only be considered for workforce employment, but may also be considered for employment as engineering assistants, lab personnel, or line supervisors. Students awarded this degree are also sought after by companies supplying materials, equipment, specialty chemicals, or services to the pulp and paper industry. Any student who meets the admission criteria may elect to take advantage of the KVTC agreement with the University of Maine and pursue a B.S. in Mechanical Engineering/Technology. The mechanical engineering graduate represents the second largest professional hire in pulp and paper in Maine.		
Program Title	**Program Type**	**Graduates & Full-Time Equivalents**
Plant & Soil Technology	Associate/ Certificate	June 2000 Graduates: 10 June 1999 Graduates: 9 Fall 2000 FTE: 36 Fall 1999 FTE: 34
Program Descriptor: Graduates will be prepared to work in a wide variety of horticultural occupations such as: nurseries and garden centers, landscaping, golf courses, horticultural equipment and supply sales, estate groundskeeping, plant and florist shops, greenhouses, interior landscaping, commercial groundskeeping, park departments, arborists, and lawn maintenance firms. Graduates from the Associate Degree program have traditionally received full credit toward a Baccalaureate Degree through the College of Natural Resources, Forestry and Agriculture at the University of Maine. Graduates can also transfer a full two years of credits toward a Baccalaureate Degree in Industrial Technology or Technology Education at the University of Southern Maine.		

Program Title	Program Type	Graduates & Full-Time Equivalents
Agribusiness Administration	Associate	June 2000 Graduates: 2 June 1999 Graduates: 1 Fall 2000 FTE: 9 Fall 1999 FTE: 8
Program Descriptor: Graduates will be prepared to work as managers or salespersons in farm supply stores or farm products marketing firms; agricultural field services persons, salespersons, demonstrators, or plant managers of food companies; farm product inspectors; or farm managers. Graduates will also be prepared to continue their education in the field at a four-year institution.		
Marine Sciences		
Program Title	**Program Type**	**Graduates & Full-Time Equivalents**
Applied Marine Biology & Oceanography	Associate	June 2000 Graduates: 3 June 1999 Graduates: 5 Fall 1999 FTE: 18 Fall 2000 FTE: 19
Program Descriptor: This program provides students with the academic background and the applied skills required for employment as research assistants and technicians in a variety of aquatic and environmental fields. The curriculum emphasizes laboratory and field procedures used by professionals working for companies and organizations involved in marine/aquatic research and ecosystem management. Graduates have found employment with public or private marine biology laboratories, state and federal environmental protection agencies, state and federal marine resource agencies, environmental consulting firms, water districts, and pollution control facilities. Graduates may also transfer to other colleges to pursue advanced degrees. The Applied Marine Biology and Oceanography program is also a MATE partner. MATE, which stands for Marine Advanced Technology Education, is one of eleven "Centers of Excellence" currently funded by the National Science Foundation's Advanced Technology Education (ATE) program.		

Program Title	Program Type	Graduates & Full-Time Equivalents
Aquaculture/Mariculture Technology	Associate/ Certificate	*New Program:* Fall 1999 Fall 1999 FTE: 2 June 2000 Graduates: N/A Fall 2000 FTE: 3
Program Descriptor: This program prepares students for a variety of entry-level positions within the industry. Courses are offered in technical areas such as Introduction to Mariculture, Marine Ecology, Aquaculture Automation, Finfish Husbandry, Shellfish Husbandry, Fish Health, and Aquaculture Technology. There are also opportunities for a variety of internships and specialized projects.		

Program Title	Program Type	Graduates & Full-Time Equivalents
Boatbuilding Technology	Associate/ Diploma/ Certificate	June 2000 Graduates: 9 June 1999 Graduates: 20 Fall 2000 FTE: 16 Fall 1999 FTE: 19
Program Descriptor: The purpose of the Boatbuilding Technology specialty of the Marine Technology Associate in Applied Science curriculum is to prepare students for success in a broad range of entry-level positions in the boatbuilding/marine industry including boat construction, maintenance, and repair. Through a combination of technical instruction and practical boatbuilding experience, students acquire an understanding of the principles of boat design and drafting as well as the skills needed for lofting, building and maintaining wooden and composite boats. Students are also made aware of the techniques and importance of accurate cost estimating and of labor and materials cost control. Successful completion of the program qualifies graduates for a variety of positions in boat construction, marine drafting, maintenance and repair in boatyards, marinas, and in private boatbuilding companies.		

Program Title	Program Type	Graduates & Full-Time Equivalents
Marine Mechanics Technology	Certificate	June 2000 Graduates: 2 June 1999 Graduates: 6 Fall 2000 FTE: 5 Fall 1999 FTE: 5

Program Descriptor: The Marine Mechanics Certificate program will prepare students for success in entry-level positions in the field of boat engine and systems installation, maintenance and repair. The program is designed with a systems approach to installation, diagnosis, maintenance, and repair of mechanical and electrical systems of commercial vessels and pleasure craft.
Graduates of this certificate program will find employment in boatyards, marinas, and in private boatbuilding companies. Students may elect to continue their education in the Marine Technology Associate Degree program.

Environmental Technology

Course Descriptor: This two-year program's curriculum emphasizes topics in treatment technology, hazardous materials, chemical analyses and instrumentation, biology and ecology, and environmental laws and regulations.
The Environmental Technology program provides skills for employment opportunities in the industrial health and safety, hazardous materials and toxic waste, wastewater and water treatment plant operations, solid waste management, air quality monitoring, environmental sampling and laboratory analyses, natural resource management, environmental assessment, and the compliance and enforcement fields.
Graduates of Environmental Technology who wish to pursue a Baccalaureate Degree can receive advanced standing based on an informal "2+2" agreement with the University of Maine's College of Natural Resources, Forestry and Agriculture (a B.S. in biology). They are also eligible for "2+2" agreements with Husson College in Business Administration or the University of Southern Maine agreement with majors in Industrial Technology or Technology Education.
A Certificate program is offered in Pollution Abatement Technology. This program is designed to provide graduates with the required skills for placement in a variety of specialized positions in the field of wastewater treatment. Graduates have been employed in the public and private sectors as treatment plant operators, laboratory technicians, wastewater treatment consultants, industry sales representatives, and superintendents.

Bioscience		
Program Title	**Program Type**	**Graduates & Full-Time Equivalents**
Bioscience Technology	Associate	June 2000 Graduates: 5 June 1999 Graduates: 1 Fall 2000 FTE: 10 Fall 1999 FTE: 11

MAINE
TECHNICAL COLLEGE
SYSTEM

Natural Resources Industry

Statewide Education & Training Program Overview

Natural Resource Programs at Maine's Technical Colleges

▲ **Eastern Maine Technical College**
Pulp & Paper Technology, Certificate

▲ **Kennebec Valley Technical College**
Bioscience Technology, Associate Degree
Pulp & Paper Technology, Associate Degree/Certificate

▲ **Northern Maine Technical College**
Agribusiness Administration, Associate Degree
Pulp & Paper Technology, Certificate

▲ **Southern Maine Technical College**
Applied Marine Biology & Oceanography, Associate Degree
Environmental Technology, Associate Degree
Plant & Soil Technology, Associate Degree/Certificate
Pollution Abatement Technology, Certificate

▲ **Washington County Technical College**
Aquaculture/Mariculture, Associate Degree/Certificate
Marine Technology (Boatbuilding), Associate Degree
Boatbuilding Technology, Diploma
Small Craft Design, Certificate
Wooden Boatbuilding, Certificate
Marine Composites, Certificate
Marine Mechanics Technology, Certificate

C. University of Maine System : Teaching, Research, and Public Service Related to Forestry, Farming, and Fishing

(by James Breece)

The University of Maine System serves the State of Maine and the nation through the activities of its seven institutions - the Universities of Maine at Augusta, Farmington, Fort Kent, Machias, and Presque Isle, all regional baccalaureate institutions; the University of Southern Maine, a comprehensive urban university serving the most populous region of the state; and the University of Maine, the state's land-grant university for more than 135 years, sea-grant college for two decades, and center for forestry, farming, and fishing-based research. All UMS institutions share a common threefold mission of education, research, and service to the public. This latter mission is particularly embraced by the University of Maine through the activities of its Maine Agricultural and Forest Experiment Station and the University of Maine Cooperative Extension. And although this report specifically addresses those academic programs, research, and public service related to forestry, farming, and fishing, it is important to note that the University of Maine System is a comprehensive system of higher education that offers to the citizens of the State of Maine the practical training, the professional experiences, and the liberal education that are necessary to make smart work and wise enterprise possible.

ACADEMIC PROGRAMS

The foundation of the tripartite mission of University of Maine System institutions is teaching - passing on the knowledge, understanding, and experiences that enable critical thinking, creativity, and analyses of ethical concerns. Teaching and learning empower our students and provide the means for research and service. With its broad geographic, climatic, and landscape diversity, the State of Maine provides an exceptional outdoor laboratory for University of Maine System students interested in the natural sciences, agriculture, forestry, aquaculture and marine science, and engineering.

Dozens of faculty members system wide teach hundreds of courses that focus on forestry, farming, and fishing - from Silviculture and Forest Products and Harvesting at the University of Maine at Fort Kent, to Animal Nutrition at the University of Maine at Augusta, to Aquatic and Marine Biology at the University of Maine at Farmington, to Natural Resource Policy at the University of Maine at Presque Isle, to Soils and Land Use at the University of Southern Maine. Every UMS institution offers at least one program and/or course that somehow relates to forestry, farming, and fishing in this state, and six of seven institutions offer baccalaureate programs in some aspect of environmental science.

The University of Maine's College of Natural Sciences, Forestry, and Agriculture offers the widest diversity of courses and programs that target forestry, farming, and fishing in the University of Maine System, taught by a faculty that comprises the largest group of scientists in the State of Maine. In addition to forestry, wildlife, agriculture, marine sciences, and a full spectrum of natural resource-based programs, UMaine students can choose to study in the areas of biological sciences, geological sciences, and food science and human nutrition. Of 1,310 undergraduate students enrolled in the College of Natural Sciences, Forestry, and Agriculture in fall 1999, 807 (62%) had declared majors relating to

fishing, farming, and forestry. An even larger percentage of graduate students (229 of 300, or 76%) is studying in these majors. Academic programs in the College of Natural Sciences, Forestry, and Agriculture are enhanced by an array of opportunities for students to obtain hands-on experience in their areas of study, frequently as early as their first semester at UMaine. These include:

- The 1,270-acre Demeritt Forest and the 4,000-acre Penobscot Experimental Forest adjacent to the campus
- The Lyle E. Littlefield Ornamentals Trial Garden on the Orono campus
- The J.F. Witter Teaching and Research Farm adjacent to campus, where students can participate in an experiential learning program, making decisions about feeding, breeding, animal health, day-to-day operations, and the financial aspects of running a farm
- The Black Bear Food Guild, a community-supported agricultural endeavor initiated and developed by students, where students manage two acres of vegetable production, an acre under cover crop, and 1/3 acre devoted to seed increase for a Maine-based cooperative seed company
- The Semester-by-the-Sea in-residence program at UMaine's Darling Marine Center in Walpole, Maine, where students are exposed to the study of marine ecosystems and a wide variety of marine organisms.

Nearly all of the academic programs in the College of Engineering at the University of Maine support farming, forestry, and fishing. Highlights of the programs offered include:

- Bioresource Engineering – agricultural, aquacultural, and food engineering, farm equipment, fluid power, irrigation
- Chemical Engineering – biotechnology, pulp and paper technology
- Civil and Environmental Engineering – environmental protection, structural wood design, waste treatment, water quality and resource management, transportation systems/highways, rail links, ports and harbors
- Computer Engineering – computer control systems, robotics
- Construction Management Technology – building construction
- Electrical Engineering – power generation systems, sensors
- Electrical Engineering Technology – electrical systems
- Mechanical Engineering – composites for shipbuilding, industrial manufacturing
- Mechanical Engineering Technology – manufacturing engineering (sawmills, pulp and paper mills)
- Spatial Information Engineering – aerial photography and satellite imagery of forest lands, navigation systems, surveying

The Pulp and Paper Foundation, organized in 1950 to encourage capable students to consider paper industry-related technical careers in Maine, provides ongoing support of the forest industries. Since the Foundation's inception, more than 2,500 students in the College of Engineering, most concentrating in chemical engineering, have received full tuition scholarships. The College of Engineering at the

University of Maine proudly claims more engineering alumni working in the paper industry in Maine and the nation than any other university in the United States.

RESEARCH

Maine's greatest challenge is to prepare for a future that will be considerably different from the recent past. Changes are likely in the state's climate, economic environment, natural resource base, agricultural output, technological capabilities, and the attitudes of its people. These changes are fundamentally interconnected. Projected changes in climate, for example, may well lead to forests that differ vastly in species composition and growth rates, a growing season suitable for different agricultural crops, and weather that alters seasonal recreation in important ways, all of which have profound and far-reaching social, economic, and political consequences.

The University of Maine System has an obligation to help the state prepare for the emerging physical and social environment. By providing well-trained undergraduate and graduate students, and by initiating and supporting a wide array of research programs, the University System can help to lead Maine residents to and through a prosperous 21st century.

Research at many campuses of the University of Maine System focuses on Maine's forestry, farming, and fishing. At the University of Maine at Machias, for example, faculty work closely with the Beals Island Regional Shellfish Hatchery (BIRSH) to provide extensive outreach programs to schools and communities in the Machias region. Researchers at the University of Maine at Fort Kent study old-growth red spruce forests in Aroostook County, while colleagues at the University of Maine at Farmington examine composting and plant root-soil microbe interactions, the water quality of western Maine lakes, and the relationship between fertilizer use and levels of nitrogen in soils. At the University of Maine at Presque Isle, faculty conduct research on crayfish parasites and on the fungi of old growth forests. Much of this research provides opportunities for undergraduate students to participate in studying issues related to the natural resources of Maine.

Researchers at the Marine Law Institute of the University of Maine School of Law in Portland actively study issues relating to coastal and ocean resource law and policy. Research initiatives there consider interjurisdictional problems in marine resource management, the use of scientific knowledge in marine law, and issues affecting coastal zone management, including analysis of coastal resource laws and regulations designed to effectively manage coastal development pressures.

As the center of research for the state, the flagship University of Maine, not unexpectedly, leads the University of Maine System in providing resources and opportunities for study in areas that focus on Maine's forestry, farming, and fishing endeavors. In the College of Natural Resources, Forestry, and Agriculture alone, more than $12 million in extramural research funds were awarded between July 1, 1999 and June 30, 2000. Nearly all of these funds were committed to research conducted in the areas of forestry, farming, and fishing.

Research in forestry focuses on maintaining and enhancing the quality and sustainability of Maine's forest resources for a variety of end uses and products. Selected research projects in this area include:

- The Pulp and Paper Process Development Center, a pilot facility that tests changes in raw materials, manufacturing process, and evaluates equipment performance
- A comprehensive program assesses the state of Maine forest using satellite and remote sensing data
- The Forest Ecosystem Research Program (FERP) investigates alternative methods of harvesting that more closely resemble natural disturbance patterns in the forest
- Extensive investigation of the ecology of the pine marten in both old-growth and managed forest
- Research on the structural behavior of composite and other advanced materials
- Evaluation of the effects of fertilizer, paper mill sludge, and wood ash on tree growth
- Investigation into the possible effects of warming, due to climate change, on forest health and productivity
- Development of wood composites and other novel uses of wood in order to add value to timber harvested from Maine's woods
- Understanding the natural mechanisms of wood decay in pulping processes and wood preservation
- Evaluation of the impact of increasing foreign competition on the forest economy of Maine
- Investigation of the importance of wetlands as habitats for wildlife species
- Development of software for use in manufacturing industries.

The University of Maine, with its land-grant designation, provides the traditional support of and research into the state's agricultural system, which includes production and food processing. Examples of such farming-related research initiatives include:

- The Potato Ecosystem project, a consortium of researchers working to develop improved cropping systems for one of Maine's major agricultural crops
- Research into the cycling of phosphorous in Maine lakes to help better understand factors leading to the release and bioavailability of phosphorous
- Supplemental irrigation research and improvement of soil physical characteristics
- Development of integrated pest management programs, particularly biointensive and biorationale insect management strategies, to minimize environmental, health, and safety concerns
- Innovative processing technologies applied to Maine agriculture products to create value-added foods
- Marketing research to examine production costs, consumer preferences, and marketing opportunities for existing commodities and potential new products
- Policy research to examine how changes in farming systems and government regulation affect the Maine farming community
- Development of new methods to detect multiple potato viruses
- Development of immunoassay methods to rapidly analyze certain fungicides in processed foods
- An embryo transfer project that uses donated frozen embryo from some of the state's top dairies to improve quality and volume of milk produced

- Immuno-polymerase chain reaction method used as an accurate and noninvasive method for determining the sex of bovine embryo prior to its transfer or cryopreservation.

Scientists at the University of Maine represent Maine's largest concentration of fisheries and wild marine resources expertise. Selected research examples include:

- Concern over the presence of mercury in the environment has led to research in the bioaccumulation of mercury in Maine's freshwater fish
- Research on the development and physiology of larval fishes will contribute to culture of cod, halibut, and haddock in future expansions of the aquaculture industry Research has demonstrated the feasibility of using cryogenic gases to freeze new shell lobsters while maintaining quality
- Development of PCR assays that detect and identify several fish viruses in one or two days (compared to two or three weeks) will help the aquaculture industry expand by reducing the high cost of managing finfish and shellfish diseases
- Marine toxicological research resulting in identification of models for mechanistic study of tumor formation and growth, and identification of organisms to serve as "sentinel species" for evaluation of pollution threats to marine environmental quality
- With the Maine Geological Survey, a unique series of charts depicting coastal marine geology has been produced, valuable for understanding distribution of wild populations, various kinds of habitat, and the siting of aquacultural activities.

In the University of Maine's College of Engineering, faculty and students conduct research and develop ideas into results daily. In fiscal year 1999 and fiscal year 2000, the College of Engineering brought in $4,016,697 and $5,074,973 in competitive extramural research grants, respectively. In addition, College researchers provide assistance to Maine industries through the Department of Industrial Cooperation. Selected projects in the College that focus on the forestry, farming, and fishing industries include:

- Bio-Resource Engineering – snow removal equipment design; cable yarding machine; wild blueberry production and processing; liquid food sampling system; crop rotation and amendment use in potato cropping systems
- Chemical Engineering – Ink and coating rheology and settling; paper surface science; pulp and paper manufacturing through the pilot plant; pulp analysis, Kraft refiner monitoring system; sulfite pulp brightness
- Civil and Environmental Engineering – advanced wood composites manufacturing; fiber reinforced polymer bridge decks; temperature monitoring in cooling ponds, glulam beam durability; mercury cycling in Acadia National Park; pedestrian safety in rural areas; repair of wood piles with fiber reinforced composites, material testing for boat building; fiberwood commercialization; water flow in harbors
- Electrical and Computer Engineering – underwater communications; shallow water signal processor; intelligent systems; ethylene sensor for determining fruit quality and storage life; early detection of pathogens

- Engineering Technology – industrial energy assessment; automation of food processing line
- Mechanical Engineering – composite material testing program; slipping, tripping, falling accident prevention in industry; strength of small round timbers
- Spatial Information Engineering – CD version of lake resources in Maine; geographic information systems; spatial data for coastal Maine.

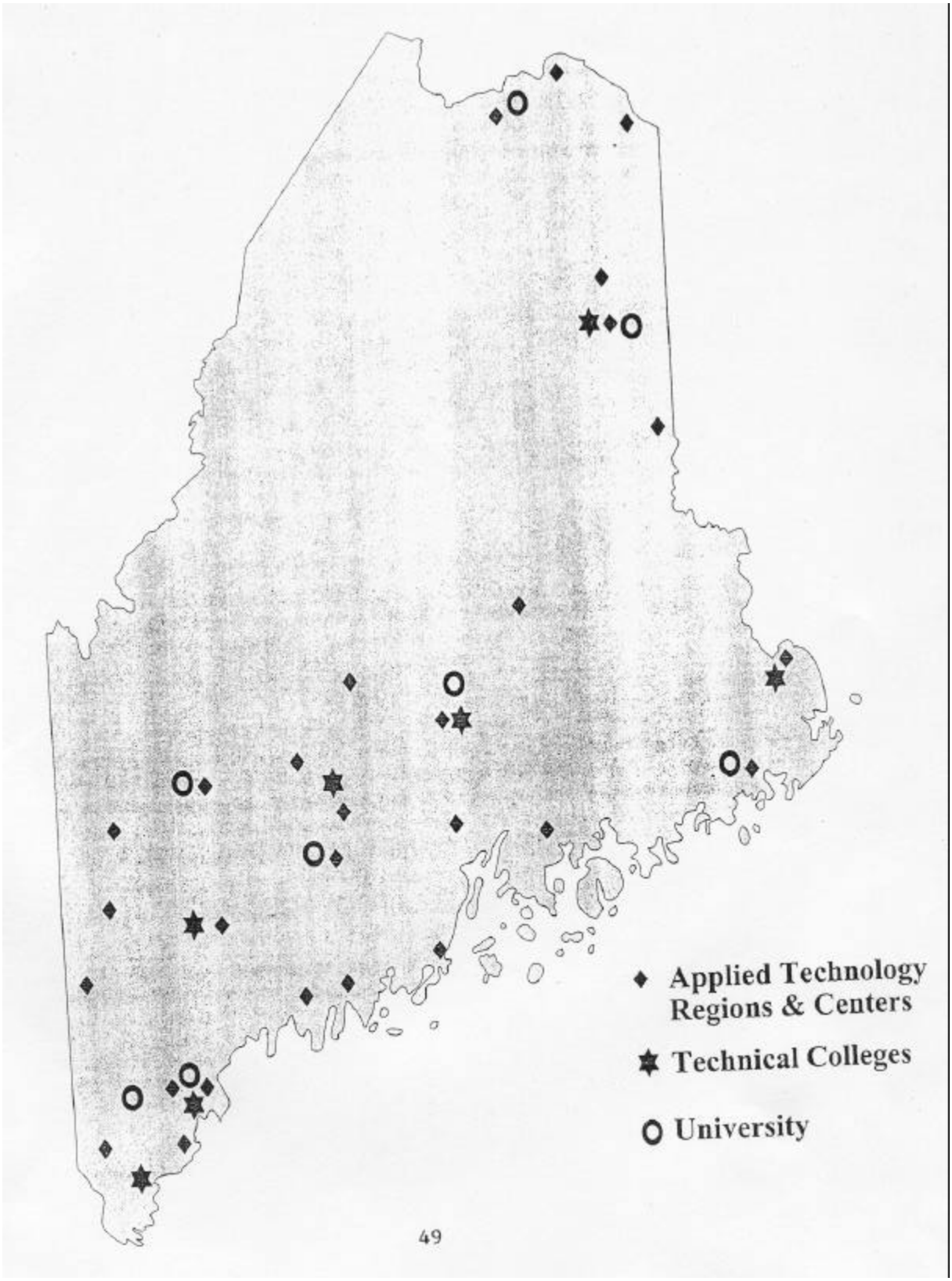
PUBLIC SERVICE

As publicly-supported institutions of higher education in Maine, the seven universities in the University of Maine System share a responsibility, specified by mission, to provide a wide variety of public service to their communities and State. In particular, the University of Maine Cooperative Extension (UMCE) serves the natural resource-based industries of Maine by delivering educational know-how to counties, communities, and individuals through workshops, courses, research, newsletters, publications, Web-based resources, and one-on-one consultations. Much of the educational outreach performed by the UMCE focuses on natural resource-based industries. In addition, the Cooperative Extension, partnering with the University, actively pursues efforts directed toward sustainability of natural resource-based industry in Maine, including coastal water quality monitoring, an insect and plant disease diagnostic lab, phytoplankton monitoring, and vegetable crop and varieties research trials. Financial resources dedicated by UMCE to these natural resource-based research and development activities total $1,268,000 annually. Nearly $90,000 annually is dedicated by UMCE to natural resource-based business development activities in the state, $37,200 to activities of the Maine Rural Development Council, an affiliate program of UMCE, and $1,358,000 to educational outreach - including Youth Agricultural Education and 4-H Youth Development, and trained staff members in 16 county offices and at the University of Maine in Orono.

At the University of Southern Maine, the Small Business Development Center (SBDC), while not offering programs that specifically target the forestry, fishing, and farming industries, does provide substantial one-on-one assistance with marketing, financial management, and access to capital in support of individuals working in these industries. Scientists and others from University of Maine System institutions are often called upon to offer expert testimony and presentations to legislative hearings and meetings of various local and regional constituencies.

CONCLUSION

Faculty and staff in the University of Maine System actively promote and provide service to forestry, farming, and fishing endeavors in Maine in many areas and in both tangible and intangible ways. The importance of and the variety of contributions made by Maine's public university system to the state's forestry, farming, and fishing industries are intertwined - in teaching, in research, and in public service - and reach every geographic region of the state. Careful study and management of these precious physical resources by the citizens of the state are-without question - essential to a promising future for Maine.


Applied Technology Regions & Centers
Technical Colleges
University

D. Maine Maritime Academy

(by William Brennan)

Maine Maritime Academy is an institution of higher learning providing undergraduate and graduate instruction in engineering, transportation, ocean studies, maritime management, port management, international business and logistics, small vessel operations, and marina management. Maine Maritime offers ten undergraduate majors leading to a Bachelor of Science (B.S.) Degree; two include a two-year Associate in Science (A.S.) option. The Department of Graduate Studies offers several opportunities for advanced studies, including Master of Science degrees, Certificates of Completion, and Diplomas. Students may transfer from the certificate or diploma programs to a Master of Science program upon satisfactory completion of the regular admission.

Engineering. The mission of the Department of Engineering is to provide the technical content of a range of broad-based majors relating to engineering of marine/mechanical/and industrial power systems. The Department offers coordinated curricula at the Bachelor of Science degree level in engineering design, engineering technology, and engineering operations. Students successfully completing any of the four on-campus major programs, if physically qualified, are eligible to receive a federal or state license. Maine Maritime Academy, in conjunction with Bath Iron Works, offers an Associate in Science degree with two majors: Ship Design and Ship Production for individuals employed at Bath Iron Works in their apprentice Program.

Marine Transportation. The Department of Marine Transportation offers studies in practical and theoretical topics of vessel operation and navigation. The curriculum also includes courses in associated topics as they relate to the maritime industry. The Marine Transportation Operations major leads to a Bachelor of Science degree and, if physically qualified, eligibility to sit for a federal examination for a Third Mate's unlimited tonnage license. Two majors, Small Vessel Operations and Marine Management, lead to an Associate in Science Degree or a Bachelor of Science degree.

Ocean Studies. The Department of Ocean Studies is under the Corning School of Ocean Studies. The Ocean Studies major prepares generalists in the field of marine science, with an emphasis on problem solving and decision making in an ocean setting. Graduates of this program receive a Bachelor of Science degree and may pursue employment in all areas of research, resource management, aquaculture, oceanography, or in other areas of ocean science.

International Business and Logistics. The Loeb-Sullivan School consists of the undergraduate Department of International Business and Logistics and the Department of Graduate Studies. The School's mission is to prepare students for the global economy in fundamental business administration skills with a particular emphasis on logistics. Graduates of the undergraduate program receive a Bachelor of Science degree; those who complete the graduate program receive a Master of Science degree.

VI. FINDINGS AND RECOMMENDATIONS

A. Fishing

Commercial Fishing

(by Sue Inches)

1. Introduction

Maine's seafood industry provides 26,000 jobs and $777 million in economic impact to the state economy, according to a recent University of Maine study. Maine is also first in revenues for landed fish in the Northeast. The total landed value of all Maine species in 1999 was $323.8m. Fish harvesting, processing and aquaculture are an important source of employment and are the backbone of many coastal communities, particularly in the mid and downeast coast.

As near shore stocks of herring and groundfish have been depleted, a great many fishermen have switched to lobstering. Lobsters are now the number one fishery in value and numbers employed, with $184.6m worth of lobster landed in Maine in 1999 (an all-time record) and an economic impact on the state of $500m. Over 8000 full and part time fishermen and crew work in this fishery.

The second and third largest fisheries by value are farm-raised salmon and groundfish, a category of fishing that includes haddock, cod, flounder, monkfish and other species. The landed value of farm-raised salmon in 1999 was $58m. The landed value of groundfish in 1999 was $21m.

Seafood processing is also an important industry in Maine, with over 300 companies doing some form of processing. These companies range from small one and two person shops to multinational companies that process sardines and salmon. A rough estimate of the value of processed seafood sold in Maine is over $550m.

2. Methodology

The Maine Department of Marine Resources (DMR) conceived of this project as a participatory process, drawing on the wisdom of the fishing and seafood processing industries. As a result, the information presented here is not a DMR position, but reflects the barriers and opportunities as seen by industry.

Advisors to the project were the DMR Advisory Council and the DMR Lobster Advisory Council. A total of five meetings were held between these groups, and written drafts were circulated for comment to all the members. Individuals with perspectives

not represented on these councils were also consulted and asked to comment. A list of participants in the project can be found in Appendix B.

Over 50 species are fished commercially in Maine. The top ten sectors of the seafood harvesting and processing industries are considered here. By covering these sectors, we have presented an overview of Maine's fisheries today. We acknowledge the fact that we were unable to include a few of the smaller fisheries in this report.

3. Education

Traditionally, many fishermen ran their business on a "cash in, cash out" basis and were able to make ends meet. Now that the seafood industry is global and more competitive than in the past, business skills including accounting practices, computer skills, knowledge of risk and investments, management of employees and marketing are essential to success. Within a few years, reporting of catches and even sales of fish will take place electronically, requiring at least a basic level of computer skill. Business and entrepreneurial skills need to be taught at the junior high and high school level. Business mentoring and training for adults needs to be offered, especially in rural areas, as well.

On the processing side, there is a pressing a need for employees trained in food processing and manufacturing processes.

Finally in aquaculture, there is a tremendous knowledge gap on how to grow and market mussels, oysters, clams and scallops commercially. Shellfish aquaculture in Maine is at an experimental, pre-commercial stage. Fortunately, these industries are well developed in other parts of the world. Public support to bring experts to Maine to teach and mentor and also to allow Maine aquaculturists to apprentice in other parts of the world would do much to advance this industry.

Recommendations:

- ❖ Develop an aquaculture training and exchange program that would bring expert mentors to Maine and allow Maine fish farmers to travel to other parts of the world to learn aquaculture production techniques.
- ❖ Explore ways to build entrepreneurial and business education into learning results and local school curricula.
- ❖ Tailor existing business training programs (such as FASTRAC) to the needs of the fishing sector.

4. Small Business Support

Seafood is a global industry, with raw materials and finished products moving freely between continents, regions and market sectors. While many Maine companies realize this, a number of harvesters and dealers appear isolated from the interests and needs of the retail buyer and end user. The result is a risk of that some will not survive in the more competitive environment.

Maine is a small player in the global seafood market-holding less than a 1% market share for all species except lobsters. This indicates a need to continuously and aggressively seek high-end niche markets. It also indicates that processors who are not in niche markets need to be extremely flexible, expanding and contracting with the harvest and finding customers who can accept a changing product mix. Finally, it indicates that we have been price takers and market followers in some sectors, such as farm-raised salmon.

Recommendation:

- ❖ Evaluate existing tax incentive and business development programs to determine how they can be made more accessible to seafood processors, so that they can compete more effectively in regional and global markets.

More than half of Maine's fish and about one third of Maine's lobsters are shipped out of state for processing. An often cited reason for this is a shortage of and the high cost of labor. In southern Maine, where fish processing is concentrated, processors have experienced great difficulty attracting and maintaining a labor force. Seafood processing is cold, wet, manual labor that often pays less than other unskilled work. Immigrants from Asia and Africa are now the majority of the workforce in some southern Maine fish plants. Increasing automation is not seen as a viable option by most operators, because the small scale and seasonal nature of the business doesn't justify the cost of machinery.

Another related issue is the Canadian exchange rate and benefits enjoyed by labor in Canada. Thirty percent of Maine's lobster catch is processed in Canada. Canada's single-payer health care system and generous unemployment benefits during layoff periods are cited as competitive disadvantages by Maine seafood processors.

On the fish harvesting side, the labor issues are quite different. Although the median age of Maine fishermen is quite high, when there is money to be made in a fishery, people of all ages want to get in. This has resulted in a trend to limit entry into the most profitable fisheries. Lobster fishermen are now required to serve a two-year apprenticeship before becoming licensed. In some areas of the coast, there is a waiting list of several years following the apprenticeship period. Limiting entry into other fisheries such as shrimp and scallops is now being discussed.

Recommendation:

- ❖ Convene seafood processors and state officials to address a variety of issues including labor, training and recruiting, tax incentives, market development and permitting.

While health care is an important issue for all Mainers, it's an urgent one for many of Maine's fishermen. Most are self-employed and or employed by micro- businesses (five employees or less). These kinds of businesses find the cost of insurance prohibitively high and the availability of insurance products to choose from low. At the same time, the nature of the work is physically demanding and often leads to injury and accident. As a result, a large number of people in this industry are uninsured, at a great risk to themselves, their families and coastal communities.

Many seafood processing companies do not offer employees health care benefits. Much of the work is seasonal and often paid at piece rates. This places a burden on families, communities and health care facilities as people seek care on an emergency basis.

Recommendation:

- ❖ The state needs to continue working to initiate policies leading to more affordable and accessible health care for Maine's self-employed and micro-businesses.

Maine has huge potential to develop new business in aquaculture, marine biotechnology and value-added seafood processing. At present, we are far behind other states and countries in developing these industries, however. In other parts of the world where aquaculture is well developed - Canada, Norway, Japan, Chile, etc. - public investment has been an essential ingredient in bringing new products into commercial production. Public grants for capital equipment purchases and funding for science labs and experimental work have been successful catalysts for new marine industries in other parts of the world.

Applications for Maine Technology Institute grants from biotech and aquaculture firms have been numerous and well presented, indicating a strong desire from industry to develop new products and markets. While the MTI is a good start, more public funding and infrastructure that will lead to commercialization of new products produced by Maine companies is needed.

Another area of potential for Maine's fishing industry is in the application of Information Technology. At present, catches are recorded by hand in logbooks and mailed to government science offices. Fish are bought and sold mostly over the telephone. The technology that can connect boats with buyers, suppliers and scientists who are

monitoring the resource is in an early, experimental stage. Information technology has the power to transform communications within the industry and probably will do so within a few years

Recommendations:

- ❖ Encourage the public and private sectors to apply for MTI technology grants.
- ❖ Explore other ways to find needed research and development, including private and federal funds that could become available to Maine industries.
- ❖ Support on-going funding of Maine Technology Institute.
- ❖ Support on-going funding of the Maine Aquaculture Innovation Center

The lobster catch has been at an all-time record high for the past two years with more people fishing for lobsters and higher catches than at any other time in Maine's history. While this has brought prosperity to many fishing communities, it also represents a risk to those communities. The lobster catch has been cyclical in the past, and many expect the current high catches to fall. With Canadian processors buying as much as 40% of the catch and controlling a significant share of the market, lobster prices are vulnerable, as well. At the same time, opportunities in other fisheries are severely limited, due to low stocks of in-shore fish (scallops, urchins, groundfish, herring). Simply put, without lobsters, there isn't much else to fish for within reach of the in-shore lobster boat.

Recommendations:

- ❖ Every possible effort should be made to develop sustainable opportunities in other fisheries, with particular emphasis on in shore fisheries with growth potential such as shellfish aquaculture.
- ❖ Continue to support the Maine Lobster Promotion Council and seek additional funds to study the current distribution system for lobster and explore new markets for lobster products.

Although much work has been done to assess the stocks of many species, we are missing critical information about fish, lobster, habitat, oceanography and pollution on which to base fisheries management decisions. The need for additional marine science was cited in every interview and group discussion for this project. The good news is that new federal funds are becoming available for marine sciences. These funds need nonfederal matching money in order to be awarded to Maine scientists, however. A recent project sponsored jointly by DMR, Seagrant and the Gulf of Maine Aquarium identifies specific science priorities for herring, groundfish, shrimp, clams, scallops and lobsters. As part of this project fishermen, scientists and fisheries managers worked together collaboratively to pull together a comprehensive agenda for applied marine science work.

Recommendation:

- ❖ The state, in collaboration with Seagrant, the Gulf of Maine Aquarium and others need to explore alternatives for funding marine science work.

5. Access to the Resource

The Maine coast is changing from marine trade-based, year round communities to tourism and related service communities with seasonal residents. It is becoming a loose network of "summer communities" in which old neighborhood homes sit all winter without families living in them. The jobs once prominent in waterfront communities are more than just "jobs" for a fisherman or wharf owner, they are "ways of life" for community members. The fundamental questions that must be addressed with the booming economic pressures are" Should we sell the Maine coast to the highest bidders? How can we keep a working waterfront in Maine?

Coastal development has concentrated in the southwestern coast from Brunswick to Portland, but is evident as far downeast as Sorrento and Gouldsboro. Private residences and tourist facilities such as restaurants, marinas and hotels dominate the waterfront in these areas. Recent coastal development displaces open space, wildlife habitat and commercial fishing facilities.

While coastal development is visible to anyone who drives along the coast, it has not been measured in a clear, quantified way. As an example, a Department of Transportation database lists the number of piers and wharves in the state, but it doesn't tell us how many have been converted from commercial fishing to recreational yachting and boating. No studies have been done on changes in use or increases in land values on the Maine coast.

Coastal development is affecting Maine's marine industries in three important ways:

a. Commercial Access to Maine Waters

Coastal development has limited access to Maine's waters for fishermen and aquaculturists. Although many fishermen have moved their residences inland, they will always need access to the water to stock their boats with fuel, ice, bait and equipment and to land their catch. As the meetings and interviews conducted for this report revealed, water access is a primary concern of nearly every sector in Maine's fishing industry.

There are currently no public programs in place that address the water access needs of commercial fishermen. Commercial access is a critical issue that needs to be addressed if we want fishing to remain a viable Maine industry.

Recommendations:

- ❖ Support Small Harbor Improvement Program (SHIP) bond legislation.
- ❖ Encourage Coastal Program to fund staff who can proactively seek public water access sites in high priority areas and assist local entities with acquisition and improvements.

b. Conflicts Over Land and Water Use

Coastal development has restricted both traditional fishing and aquaculture due to conflicts over land and water use. Noise of diesel engines starting early in the morning, fish odors, commercial trucks, and fishing equipment and activity in sight of coastal homes are the primary sources of conflict.

Conflicts over water use have and will continue to restrict development of aquaculture in Maine. There is tremendous potential to develop both finfish and shellfish aquaculture along our coast. As demand for high quality protein grows worldwide, Maine's clean, cold waters can provide a good environment for growing mussels, scallops, oysters and a variety of fish. Annual revenues from Maine's current aquaculture industry are $60m. Approximately 1200 people work full time in aquaculture in Maine.

Many coastal residents and tourist businesses have been strongly opposed to aquaculture lease sites in their area, however. These groups want to maintain their concept of a pristine water view, without buoys, rafts or activities associated with aquaculture. This has discouraged some would-be aquaculturists from applying for leases. In other cases, aquaculture proposals have met organized opposition and even hostility from these groups. Several coastal communities are now deeply divided as a result of water use conflicts.

The basic policy question is how to balance the needs of those who want to use the coast for production (fishing, aquaculture) and those who want to use the coast for consumption (tourism, summer homes). "Right to Farm" legislation can provide some clues on how to address this issue.

Recommendations:

- ❖ Review Right of Farm Laws and explore the possibility of developing similar guidelines for mitigating waterfront use conflicts.

- ❖ Create a unified voice for waterfront development and public access by establishing a multi-stakeholder task force or work group to address these issues.

c. Increased Cost of Doing Business

Coastal development has increased the cost of doing business for fishermen primarily through waterfront real estate taxes that reflect rising land values. Some fishermen have cited tax increases as high as 300%, as they are taxed at the same rate as newly developed summer homes and hotels. Because seafood is sold regionally and globally in competitive markets, fishermen are unable to pass this added cost on to consumers and remain competitive. The result is an added cost burden on Maine's fishing industry. Other increased costs include trucking boats, traps and equipment to inland sites for service and storage, as on the water sites become too expensive to maintain.

Recommendations:

- ❖ Encourage Coastal Program to conduct research that would document changes in use and increasing value of waterfront properties.
- ❖ Explore the level of industry support for initiating a new current use taxation referendum. If industry support and financial backing is available, support referendum legislation.

6. Clear, Stable Public Policy

Fishing is unique in that it takes place in a public resource - the ocean. Waters up to three miles offshore are managed by the state through the Department of Marine Resources. Waters from three to two hundred miles offshore are managed by the federal government through the Department of Commerce, National Marine Fisheries Service (NMFS). Federal law can also affect management of in-shore waters in some cases, such as under the Endangered Species Act.

As various fisheries have grown and declined, the task of managing the resource, and working with the people who depend on it for their livelihood has grown increasingly complex. The DMR now has a full time deputy who represents Maine on regional councils and on federal issues.

Because Maine's fisheries are spread out over a long coastline and because the culture of fishing has been one of independence, Maine fishermen haven't had a unified voice on issues affecting them. In some cases, this has led to federal management decisions that have not favored Maine's industry.

On the other hand, since the creation of seven locally managed Maine lobster zones in 1996, fishermen are becoming more aware that their participation in management will result in more favorable outcomes for them. Some fishermen have attended many public meetings, often taking place far from home.

One of the disadvantages of fishing (as compared with other Maine industries) is that with state and industry resources focused on management of the public resource, little energy has been left for industry development. As examples, without public support, programs to market Maine seafood, and develop new types of fishing gear have died. Current use taxation programs that have been in place for agriculture and forestry for years, have not yet been developed for waterfront property used by fishermen. Existing tax and business incentive programs don't fit well with fishing industry needs, were not developed with their input and have been little used by this industry.

Aquaculutre is a relatively new industry in Maine. In the past several years, there has been increasing interest in growing fish and shellfish in Maine waters. Since these waters are a public resource, the state leases aquaculture sites to private entities. Unfortunately there is a backlog of leases causing delays for those who want to start or expand their business. Further, the public hearing process is intimidating to some applicants.

In short, the fishing industry has survived based on the creativity and hard work of individuals, with little advocacy from industry and little development support from the public sector. As coastal development and globalization continue to impact Maine's fisheries, expanding public support of this industry will become essential to its survival.

Recommendations:

- ❖ Create a Fisheries Development task force to study development incentives, and recommend a strategy to better support fish harvesting, processing and aquaculture.
- ❖ Address aquaculture administration and staffing issues, as described in a separate report now being prepared by DMR.

Inland Fisheries and Wildlife

(by Don Kleiner)

1. Introduction

Maine's fish and wildlife resources support a broad array of natural resource based businesses. These include both consumptive and non consumptive uses. According to a study by the University of Maine, fish and wildlife resources contribute over $1 billion annually to the state's economy. In 1996, the year for which we have the most recent data, Maine's recreational fisheries delivered $292 million in economic activity and provided 2,700 jobs. Many of these jobs

are in the rural and remote areas of the state. These resources are crucial to the economic interests of rural areas of the state.

Fishing license sales have been on a five-year upward trend, indicating that the economic impact is likely to have increased in the last half of the 1990s. As the quality of Maine's fisheries improves and efforts to increase participation increase, the impact seems likely to grow.

Hunting and trapping delivered $314.7 million dollars in economic output in 1996, and supports over 4,000 jobs. The Department of Inland Fisheries and Wildlife provides support in the form of resource management. Management is designed to maintain and enhance the wildlife resources of the state. Hunting license sales have been on a small upward trend over the last five years. Guides, sporting camps and many retail businesses are supported by hunting and fishing.

Wildlife associated recreation contributes $331 million in economic output to the state's economy and supports 6,000 jobs. The fish and wildlife management efforts of the department support much of the recreation and tourism in the state.

2. Current Industry Support

Recreational fishing takes place on publicly owned resources managed by the Maine Department of Inland Fisheries and Wildlife. The Department provides management support and oversight.

The fisheries division is dedicated to the support of the inland recreational fisheries. Their efforts range from assessing the resources currently available to enhancement projects undertaken to improve fisheries. Included in this effort is the Hatchery division, which supplies fish for annual stocking.

The wildlife division provides management of wildlife resources that are publicly owned but live on mostly private land. Efforts range from setting seasons and allowable harvest levels to maintaining management plans for a number of endangered species.

The Maine Warden Service is the law enforcement division of the Department which provides education and enforcement of hunting and fishing laws and rules, using routine outreach to hunters and anglers through a variety of media.

The Department of Inland Fisheries and Wildlife has an annual marketing budget of $100,000 for promoting hunting and fishing within the state. This expenditure is divided between in and out of state markets.

The Department also sponsors the Hooked on Fishing Not on Drugs program and Youth Field Days to encourage participation in hunting and fishing as forms of recreation. The Department offers scholarships to Maine Conservation Camp to children ages 10-14 and provides school programs and teacher training to develop awareness of fish and wildlife management. A variety of safety education programs are offered including hunter safety and recreational vehicle safety programs.

Recommendations:

- ❖ Increase marketing efforts to support the hunting, fishing and wildlife watching components of the tourism industry, especially those located in rural areas of the state.
- ❖ Support current management efforts to maintain and improve the fish and wildlife resources of the state.

3. Education

Better information needs to be made available to the people of the state on the success of fisheries and wildlife management, hunting and fishing opportunities. Fish and wildlife management assure the resources that are a basis for the outdoor recreation industry. Many opportunities to expand hunting, fishing and outdoor recreation exist, however additional financial resources are needed to support additional opportunities.

Hooked on Fishing Not on Drugs has grown significantly in the last two years with the addition of a Youth Activities position in the Department. The number of participants has gone from 6,000 to 12,000 in two years. Similar results can be expected from Youth Field Days over the next few years. The number of field days offered tripled last year.

An opportunity also exists by making Hunter education available as part of the existing school program. This will provide some exposure to the basics safety but also provide information about the management of our wildlife resources.

Because the businesses involved in the outdoor recreation industry tend to be small and diffuse basic information and support on how to run a small business is critical to the success of those businesses. Current offerings can be expanded to aim at these small one or two person businesses in rural and remote areas.

Recommendations:

- ❖ Tailor existing business training programs (such as FASTRAC) to the needs of the outdoor recreation sector.
- ❖ Increase support for wildlife and outdoor recreation education.

B. Agriculture

(by Mary Ellen Johnston)

1. Introduction

Maine farmers are stewards of 1.25 million acres of land which represents a key resource for open space, recreation and food security for Maine people. Maine ranked second in New England in 1999 with cash receipts of $518 million, a 1% increase over 1998. The employment in Maine's agricultural industry, including on-farm, processing, services, wholesale and retail, was 65,000 people in 1999. The food processing sector added $7 million for a total economic impact of $1.2 billion dollars on the Maine economy. For these reasons, Maine plays a critical role in the region's economy and food supply.

While known worldwide for certain commodities and relying heavily on bulk sales of raw product rather than value-added production, Maine agriculture is also diverse and unique in several ways. Maine ranks 8th in the nation in potato production, 2nd in maple syrup production, and 2nd in New England in milk, livestock, sheep and wool production. Maine is the largest producer of brown eggs and wild blueberries in the world. Maine has a growing number of small and unique food processors, including Raye's Mustard and Borealis Breads, and a number of value-added potato processing firms. Maine's small, diversified farms and certified organic producers supply niche markets for fresh produce and value-added food and fiber products.

The number of Maine farms has declined steadily over the last 20 years due to pressures on the land and the difficulty farmers have had nationwide to remain profitable in a changing economy. There are currently 6,900 farms in Maine, using 1.29 million acres of land, compared to 7,300 farms using 1.5 million acres in 1987. The good news is that farm gate receipts have increased over the period due to improvements in production techniques and growth of markets. A continuation of the trend towards fewer farms will have a detrimental effect on Maine's ability to maintain a strong agricultural industry and preserve the rural characteristics that help to make Maine unique.

2. Methodology

The Agriculture subcommittee of the LD 1665 Task Force included staff from the Department of Agriculture and members of the Board of Directors from the Agricultural Council of Maine (AGCOM) an organization that was formed in 1990 with a mission of assuring the continued success of Maine agriculture. Its members include representatives from every commodity group, with a board of directors, an advisory committee and a strategic planning steering committee. AGCOM works closely with the Department of Agriculture and other partners on

many agricultural issues, provides leadership in the legislature for new initiatives, helps to improve communications within the industry, and mobilizes the farming community to work cooperatively towards a sustainable industry. In 1998 AGCOM wrote its own strategic plan for Maine agriculture and has been active in promoting many of the plan's recommendations. The Council is currently working on an update of that plan and has been helpful in identifying the barriers and opportunities that are presented in this report.

3. Education

The need for training extends to farmers who are trying to adjust to the changing markets and the new technologies they are adopting to be competitive and stay in business. Farmers need to learn how to develop business plans, manage their finances, develop new markets, and hire and retain good employees.

The Maine Department of Education has developed the Learning Results which defines the educational goals for our children throughout their primary and secondary school years. There is an opportunity to emphasize the importance of agriculture, good nutrition, and the science of food production through integrated curricula. Schools should be encouraged and assisted in developing these curricula , or should utilize a program that already exists, called "Food, Land, and People."

Recommendations:

- Expand business planning courses for farmers such as FastTrac. This program has proven to be an effective way to train business owners to plan their future. Funds are needed to expand this program and pay for scholarships so more farmers would be able to participate.
- Explore ways to expand Extension Education Programs as well as post-secondary educational programs for young people and existing farmers who need training.
- Expand and develop Maine's **Agriculture In the Classroom Program** to reach more children in both rural and urban communities. The Agriculture in the Classroom Program needs to be fully supported in their work of training teachers to use a curriculum called Food , Land & People that integrates all subject areas with agricultural and other natural resource issues. With this as a base of knowledge and information, many young people will be more likely to seek out post-secondary and continuing education training programs that prepare them for careers in agriculture.
- **Best Management Practices-** The State needs to continue to support efforts to help farmers manage manure, pesticides and fertilizers through BMPs. The Nutrient Management Grant and Loan Program took effect in August 2000 and makes grant moneys available to farms that want to construct facilities that will bring them into compliance and make their operation more efficient. This program is currently funded at a fraction of the level needed to bring all Maine farms into compliance.

- **Education and Training** - Farmers also need education and training to understand the economics of proper nutrient management. Resources and staffing is necessary to produce courses and workshops statewide to help farmers gain this valuable knowledge.
- Support the **Maine Agricultural Center at the University of Maine** as they expand their mission of serving as a coordinator of agricultural research, extension and teaching activities.
- **Emphasis in the schools'** curricula on agriculture and other natural resources would help our children grow up with an interest in these sectors of our economy. This early exposure in school would increase the demand for courses offered by the University of Maine and the Maine Technical College System in bio-sciences and related fields.

4. Small Business Support

As the global economy forces changes in the marketplace, Maine farmers need to grow alternative crops, find niche markets, and do more value-added processing to remain viable. There are many opportunities to help Maine farmers become successful in the emerging markets. Reducing costs of production and improving market opportunities will lead to increased profitability and viability of Maine farms.

The driving force behind much of the changes in agricultural practices is the consumer. Our modern culture has moved people away from traditional home-cooked meals and towards fast foods, processed and packaged meals, and food products directed to special niche markets. Consumer prices have not risen proportionately due to heavy competition from low cost producers. Farmers are producing for the new processing markets to meet these demands and are adding new, costly technology to increase production and quality. These added costs along with the increasing cost of labor, taxes and regulation, are not being offset by higher prices to the farmers. They are being paid almost the same today for the raw materials as they were ten years ago.

Recommendation:

- Support marketing programs, including market research, market development and market promotion, for long term desired results.

Most of Maine's farms are operated as small family businesses. Affordable health care is a problem for all small businesses, and more so for businesses that are seasonal and dependent on the weather for their profits. Many farmers have no insurance because of the cost. They have small profits and often have to buy essential equipment and supplies for their operation, with nothing left over for insurance. According to the Maine Farm Bureau, one in five of their members have insurance through the group health plan they offer. Many farms have a working spouse who is able to get insurance through another employer. This does not address the need to offer insurance to farm workers. The tight labor market makes it more important for farmers to offer insurance benefits but some

are unable to afford both unemployment tax and health insurance. The threshold for exemption of farms from paying unemployment tax has not been raised since 1978. It would be very helpful to examine the impact this has on farmers' hiring decisions and their ability to afford other benefits.

Maine is known for certain commodities: potatoes, wild blueberries, maple syrup, brown eggs, and milk. These key commodities contribute almost two thirds of the total farm gate receipts each year. Maine is building its reputation for delivering a quality product while meeting the growing demand. Producers need technical assistance and resources to maintain their competitive edge, add value to their products and continue to grow their markets. We need to find resources for ongoing research and development, new processing technologies, marketing assistance, and improved transportation and infrastructure to support agriculture and insure its future.

Recommendations:

- Explore ways to increase the amount of value-added processing, both on-farm and off-farm.
- Find resources to expand Maine's capability for new crop and product development and new processing technologies.
- Develop Maine's "agri-tourism" industry in conjunction with other promotion efforts to attract visitors to Maine. Farms can market their products that have distinctive regional appeal and also become destinations for tourists who are looking for a rural, farm experience.
- **Organic Farming -** Many Maine farms have discovered alternative methods of growing produce that is safe for the environment and appealing to a growing market of consumers. We should support this niche and continue research and development efforts that will provide information and technology to farmers using these techniques.

5. Access to the Resource

Land traditionally used for crops and livestock production is being converted to housing, commercial and industrial development, and other nonagricultural uses. The pressure on land continues relentlessly as people spread out and seek "open space" in which to live. As a result, we are losing farmland and the ability to maintain a critical mass of farming in communities that have traditionally supported many agricultural businesses. The vitality of Maine's agricultural sector depends on our continuing efforts to improve profitability for farmers so they can afford to hold on to the land base rather than sell it for development. Farmers have been the stewards of the land for generations. Any changes that will affect farm families ability to live in their communities will also affect the community's ability to maintain its rural character and heritage.

Recommendations:

- **Tax relief** - We must continue to help farming be economically viable. While farms are under development pressure, their tax burdens often cause hardship as they try to keep their costs down. Through continued examination of the various tax programs and incentives, and state and local policies that affect farmers, we can seek the balance that is needed here.
- **Transfer or Purchase of Development Rights**- While these are excellent tools for protecting land from development, they require financial and technical resources with which to function. Additional sources of funding need to be explored to enable more property owners and local land trusts to participate. Technical assistance is needed for farmers who are contemplating this approach to estate planning.
- **FarmLink** - We need to develop our own information network, a **data base** through which retiring farmers can find a buyer for their farm, and young farmers can be matched with a farm they can afford, or one that offers an apprenticeship or training program for them. This requires partnering among the agriculture community to find resources to set it up and manage it.

6. Clear, Stable Public Policy

The shortage of farm workers has reached a critical point. All industries are faced with the demographics of aging workers and not enough young and knowledgeable workers to fill their shoes. Traditional industries, where the work is hard and not as glamorous as the new jobs of the computer age, find it hard to compete for workers. Seasonal labor issues need to be addressed as well as the need for permanent, skilled professionals. The educational opportunities for agricultural employees need to be expanded throughout the state. Young people need to learn about agriculture early in school and be encouraged to consider careers in farming.

Recommendations:

- Examine Maine's labor laws and federal immigration rules to determine ways to increase pool of skilled farm workers.
- Develop **Agricultural Internship** and exchange programs through educational institutions and suitable federal foreign recruitment agencies. These programs help foreign students learn about our agriculture while providing critical help on small farms in Maine.

Besides its economic contribution to the state, the taxes farmers pay in their communities, and the care and maintenance of 1.25 million acres of land, farming gives Maine much of its character and personality, open spaces and recreational lands, and rural traditions that add up to a quality of life that we can no longer take for granted. We need to strengthen public support for, and appreciation of, the role of Agriculture in Maine. The next generation will be more interested in careers in Agriculture if the industry is thriving, exciting, and full of promise. The Department of Agriculture is currently doing the baseline research to determine how much of the food consumed in

Maine is produced in Maine. It is also determining how much Maine-grown food is being purchased by institutional and restaurant buyers, and finding ways to encourage additional purchases.

Farmers have always played an important role in maintaining our soils and water resources. They have worked hard in recent years to employ Best Management Practices to reduce water pollution and soil erosion. As these requirements become more strict and imposing, farmers will be weighing the cost of compliance with the benefits to their operations and their ability to remain profitable. The loss of farms over the last decade can be partially attributed to the inability of many farms to adapt to the new regulations that have come at both the state and federal levels. Farms are working with the research and education community to reduce their use of pesticides, manage manure, and control erosion so they can be in compliance with new and stricter regulations. Policy makers need to carefully consider the impact of new regulations on the farming community.

Recommendations:

- **Public Awareness Campaign-** The Department of Agriculture is currently doing the baseline research to determine how much of the food consumed in Maine is produced in Maine. It is also determining how much Maine-grown food is being purchased by institutional and restaurant buyers, and finding ways to encourage additional purchases. With this information, it would be possible to launch a publicity campaign informing the citizens of Maine about our buying habits and encouraging everyone to support Maine agriculture.
- **Buy Local** - There is new emphasis today on buying locally grown produce, and supporting farm stands and farmers markets. This serves a dual purpose of helping the public be more aware of the importance of agriculture and also giving the producers a growing market of customers who are locally based.
- **Food Security Plan** - In the event of a disaster that would interrupt the transportation infrastructure that moves goods around, Maine would be without food in about ten days. We need to develop a food security plan that would reduce our dependency on imports, provide food security for low income Mainers and open up local markets for Maine farmers.

C. Forestry

(by Jack Lutz)

1. Introduction

Maine's forest products industry is incredibly complex and made up of a number of sectors including:

Timberland Owners

Forest Managers
Loggers
Truckers
Primary Processors
Secondary Manufacturers

Other related sectors include equipment dealers, banks and other lending institutions, and forest-based recreation activities.

Some Maine firms encompass all six of the major sectors, while others cover only one. Firms range in size from pulp & paper mills employing thousands to 1 or 2 person woodworking shops. In general, the industry in Southern Maine is comprised of smaller firms and smaller timberland holdings while timberland holdings and processing plants in Northern Maine are larger.

2. Methodology

A subcommittee of seven was assembled with members representing many of the industry sectors and with a combined total of nearly 150 years of forest industry experience (a list of subcommittee members appears in the Appendix). The subcommittee contacted individuals and representatives of industry associations in Maine and asked for their opinions on barriers and opportunities to the industry. Some of these contacts were in the form of personal interviews and some were in the form of an e-mail survey. Issues vary between large and small companies and between the northern and southern areas of the State. The list of barriers and opportunities provided by survey respondents runs to several pages. Each sector has unique challenges, but some challenges are found in all sectors. For this report, we have focused on key issues common to all the sectors.

3. Education

Firms in all sectors of the industry report a shortage of labor. While this problem has become more acute during the recent period of falling unemployment rates, it is not a recent problem. One dilemma is that many of the industry's skills are transferable. The skills needed to run a timber harvester 30 miles up an icy road in below-zero weather in Northern Maine are similar to those needed to run an excavator 30 feet from a doughnut shop in Southern Maine - and the Southern Maine job will pay more. Population trends - declining in northern and rural areas while increasing in urban and coastal areas - add to the challenge of recruiting and keeping quality labor in many areas of the state where the forest industry operates

While there are some very large forest products companies in the state, there are also many small (<50 employees) companies in the fields of logging, trucking and wood products manufacturing. Many owners/managers of small forest-related businesses lack

information or management skills necessary to grow (or maintain) their businesses. Financing is often a problem for these small businesses. The owners often do not understand the banking and financing business and lenders often do not understand the logging or wood products business.

More knowledgeable management will result in improved profitability of these small firms, which in turn will result in more stable employment or even increased employment.

The State, industry associations and other nonprofit organizations are aware of this issue and have provided training programs in the past. However, new businesses are constantly being started and existing businesses are sold/purchased or expanded, so the need for these programs continues

Recommendation:

- **Improve the marketing and coordination of small business training programs by the State, educational institutions, trade associations and nonprofit groups.** Coordination will result in a better allocation of resources by the program presenters and a better coverage of the State.

4. Small Business Support

Maine's paper and wood products are competing in global markets. The industry has little ability to raise prices to cover increased costs of raw materials, labor, taxes and regulations. While technological innovation and automation have led to a decline in employment, the industry remains the largest segment of Maine's economy. Innovation and employment reduction have strengthened businesses in Maine and enabled them to remain globally competitive. Several recent proposals and announcements for engineered wood product facilities could recapture some of the lost jobs and increase value-added manufacturing of solid wood products.

Recommendation:

- **Educate smaller Maine forest industry companies about how to reach out to, and compete in, national and international markets.** Smaller companies are less likely to have the expertise and capacity to develop and exploit markets outside Maine and New England. These companies need to be connected to existing State business development programs.

Maine's worker's compensation cost controls are working very well. The reforms have had a major impact on costs and reduced one of the most significant disadvantages to

doing business in Maine. The legislature must avoid creating instability and resist tinkering with those reforms.

Health insurance is a critical issue for small firms in the industry. High costs make it difficult to provide coverage for a small number of employees. Lack of coverage makes it difficult to recruit employees.

Recommendations:

- **Leave Maine's worker's compensation reforms alone.**
- **Include small forest industry firms in efforts to lower health insurance costs for small businesses in the State.** Forest products firms or their employees could be pooled into insurance groups. These groups could also include firms from other natural resource industries in Maine.

A significant volume of pulpwood is imported to, and logs are exported from, the State each year, with the bulk going to and from neighboring States and Canada. Keeping logs in the State would allow for increased production and employment without an increase in timber harvesting. However, a simple prohibition on log exports would be an illegal restriction on trade and penalize timberland owners who would lose access to higher priced log markets. Consider providing assistance to processing mills to improve competitive ability, productivity, lower costs and improve markets.

Recommendation:

- **Create appropriate incentives to encourage processing of Maine-grown logs in Maine.**

5. Access to the Resource

Development pressures are particularly strong in Southern Maine. Urban sprawl removes timberland from production as wood lots are cleared for houses and lawns and commercial strips. Timberland holdings are increasingly fragmented, increasing logging costs. Loggers find it difficult to operate in residential areas as they meet resistance from neighbors. Individual towns have enacted laws to restrict logging and trucking activity. The increased difficulty and cost of obtaining wood in the southern counties makes it more difficult for processors to continue operating in the region.

Northern Maine is not immune to development pressures. During the late 1980s, a number of large timberland holdings in the region were subdivided into camp lots. This activity slowed substantially after changes were made to the subdivision regulations in the unorganized towns.

6. Clear, Stable Public Policy

Largely as a result of recent referenda questions, Maine does not have a clear and concise forest policy as in other states such as Alabama and Florida. The State has not clearly formulated a policy that supports and encourages a strong and healthy forest industry. Many survey respondents note Maine's failure in this regard as a leading reason why there is so much instability in the industry in Maine. The lack of a clear policy produces uncertainty over future timber harvest levels. This uncertainty keeps firms from making substantial manufacturing investments in the state.

The lack of a clear forest policy has also raised public concerns about the condition of Maine's forests. Reactions to recent referendum questions suggest public concern about potential over harvesting. Industry forestry experts argue that growth and harvest rates are roughly in balance when you look at forest condition over the long-term.

The referendum process is the most destabilizing influence of all Maine State policies. Complex issues are inadequately understood or addressed and hidden beneath ballot questions requiring a simple "Yes" or "No" response. Referendum impact realities are not made clear to voters and all are left wondering who they should believe, forestry experts or the activists. .

Recommendations:

- **Revise the referendum process.** The Secretary of State should require that questions reflect the full range of issues covered by referendum language. This would avoid inappropriate "Yes/No" kinds of answers on incredibly complex issues. Require signature gatherers for statewide issues to obtain signatures in each county in percentages equal to the number of voters in each county. This would reduce the incidence of voters in one part of the state imposing rules on another part of the state.
- **Develop a comprehensive forest policy that provides direction on current and emerging issues.** Consider using policies from other states (e.g., Alabama and Florida) as examples upon which to build. Communicate the forest policy throughout the state. Follow the example of Florida's *Florida Forests Forever* campaign. (Selected pages from the *Florida Forest Forever* web site are included in the Appendix). Given the continued importance of all natural resource sectors to Maine's economy, include a course on natural resources in high school curricula.
- **As new laws, regulations and rules are proposed, carefully examine the economic impact on forestry and the forest products industry in Maine.** Any increase in the cost of doing business in Maine lowers the ability of Maine's forest industry to compete on a global scale.

The Tree Growth Tax program is perhaps the most effective existing tool for slowing the conversion of timberland to houses or stores. However, over time the legislature has increased the costs of remaining in the program by adding requirements for participation in the program. For example, participants are now required to have a forest management plan prepared by a licensed forester. While a forest management plan is a good thing to have, adding costs and rules to the program will discourage additions to the program.

Recommendation:

- **Maintain the Tree Growth Tax program and avoid adding to the cost of belonging to the program.**

Transportation is one of the most significant costs to our industry, and probably one with the greatest opportunity to manage these costs. Consider merging industry and public transportation needs. Increased rail activity would reduce the number of trucks on public highways in the same way as the large private road network do in the northern part of the State.

Recommendations:

- **Improve transportation systems (road and rail) in Northern Maine to lower the cost of transporting forest products.**

Appendix A

Fishing, Farming and Forestry Advisory Council
LD 1665
(revised 12-11-00)

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Appendix B

Fishing Industry Stakeholder Advisors

This report would not have been possible without the time and feedback generously given by a large number of people. Many thanks to:

The DMR Advisory Council :

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Craig Pendleton, Harvester, Northwest Atlantic Marine Alliance, Saco
L. Blair Pyne, Harvester, Bremen
Stephen Train, Harvester, Long Island
Marshall Alexander, Harvester, Biddeford
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The DMR Lobster Advisory Council :

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Larry Knapp, Boothbay
Norbert Lemieux, Cutler
Alfred McLaughlin, Port Clyde
Dana Rice, Birch Harbor
Ted Hoskins, Blue Hill
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Stephen Train, Long Island
William Doane, So. Portland

The DMR Licensing Office:

Helen Holt
Sandy Randall
Kim Fleury
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The Following Individuals Who Offered Their Comments:

Susan Barber, Sebastian Belle, Jay Burke, Angelo Cioccia, Chip Davison, Penn Estabrook, Mike Hastings, Bruce Joule, Jeff Kaelin, Pat Keliher, George Lapointe, Dave Libby, Joe McGonigle, Linda Mercer, John Norton, Elizabeth Sheehan,Terry Stockwell, Laura Taylor, Dana Wallace, Wendi White, Jim Wilson, Hal Winters.

Appendix C

AGCOM Board of Directors

Steve Hobart	- Maine Association of Conservation Districts
George Cummings	- Maine Beef Producers
Dave Bell	- Wild Blueberry Commission of Maine
David Popp	- Maine Cranberry Growers Association
Fred Hardy	- Maine Dairy Industry Association
Ken Hogate	- Maine Dry Bean Growers Association
Jon Olson	- Maine Farm Bureau and Maine Equine Industry Association
Skip Fairfield	- Maine Federation of Farmers Markets
Vicki Schmidt	- Maine Maple Producers Association
Russell Libby	- Maine Organic Gardeners and Farmers Association
Mike Corey	- Maine Potato Board
Bill Bell	- Maine Poultry Federation
Brant Miller	- Maine Sheep Breeders and Owners
Don Marean	- Maine Standardbred Breeders and Owners
Scott Foster	- Maine Florist and Growers Association
Judy Dimock	- Maine State Pomological Society
Alan J. Lamond	- Maine State Rabbit Breeders Association
Steve Goodwin	- Maine Vegetable and Small Fruit Growers Association
Dave McGlinchey	- Northern New England Deer Farmers Association

Appendix D

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Appendix E

STATE OF MAINE

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IN THE YEAR OF OUR LORD TWO THOUSAND

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S.P. 585 - L.D. 1665

Resolve, to Promote Natural Resource-based Industries

Preamble. Whereas, natural resource-based industries are the foundation of the State's economy; and

Whereas, the number of individuals entering farming, fishing and forestry is declining steadily; and

Whereas, natural resource-based industries are nonmobile industries rooted in the culture and ecology of the State, placing the State in a unique position; now, therefore, be it further

Sec. 1. Business development; education programs. Resolved: That the State Planning Office shall submit a report to the joint standing committee of the Legislature having jurisdiction over business and economic development matters by January 1, 2001 that:

1. Examines the resources available to business development and specifically how funds are dedicated to development in the natural resource-based industries. The report must specifically review the proportions of dollars spent on economic development and the percentage of those dollars that are aimed at natural resource-based industries;

2. Analyzes existing education programs and the status of workforce wages and benefits and the average age and availability of workers to fill the current needs of natural resource-based industries;

3. Develops a proposal based on the analysis pursuant to subsection 2 to establish education programs for secondary and postsecondary schools, including vocational and technical college systems, with the aim of increasing the number of trained entrants into the natural resource-based industries; and

4. Identifies barriers to and opportunities for enhancing the growth and sustainability of the State's natural resource-based industries.

Following receipt of the report, the joint standing committee of the Legislature having jurisdiction over business and economic development matters may report out a bill during the First Regular Session of the 120th Legislature.

Appendix F

Economic Data : History and Forecast

MAINE Employment:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA estimates)

(Data expressed in thousands of Maine jobs)

	1970 (history)	1971 (history)	1972 (history)	1973 (history)	1974 (history)	1975 (history)	1976 (history)	1977 (history)	1978 (history)	1979 (history)
FORESTRY SECTOR:										
Paper (SIC 26)	17.587	16.68	17.159	17.67	17.719	16.708	17.179	18.115	17.642	18.027
Lumber (SIC 24)	15.519	14.841	15.32	16.391	17.007	14.955	16.174	17.081	19.238	18.565
Forestry (SIC 08 BEA/SPO estimate)	0.702	0.753	0.968	0.706	0.94	1.228	1.201	0.899	0.665	0.704
TOTAL: Forestry Sector Employment	33.808	32.274	33.447	34.767	35.666	32.891	34.554	36.095	37.545	37.296
Forestry's Share of Maine's Total Employment	7.9%	7.5%	7.6%	7.6%	7.7%	7.1%	7.2%	7.3%	7.3%	7.0%
FARMING SECTOR:										
Farm (BEA/REMI estimate)	17.169	15.355	13.947	14.522	14.649	13.898	14.842	15.659	15.086	15.072
Food MFG (Ag. related SIC 20 EMP)	8.045	8.188	8.057	7.342	7.296	6.988	7.092	7.426	7.579	7.441
Agricultural Services (SIC 07 BEA/SPO estimate)	1.994	2.151	2.003	2.278	2.18	2.127	2.266	2.355	2.568	2.817
TOTAL: Farming Sector Employment	27.208	25.694	24.007	24.142	24.125	23.013	24.200	25.440	25.233	25.330
Farming's Share of Maine's Total Employment	6.3%	6.0%	5.5%	5.3%	5.2%	5.0%	5.0%	5.1%	4.9%	4.8%
FISHING SECTOR: (SPO/DMR Estimate)										
Food MFG (Fish related SIC 20 EMP)	2.639	2.686	2.643	2.409	2.394	2.292	2.327	2.436	2.486	2.441
Commercial Fishing (SIC 09 BEA/SPO estimate)	4.269	5.076	5.576	6.785	6.308	6.674	8.13	7.246	6.847	7.192
TOTAL: Fishing Sector Employment	6.908	7.762	8.219	9.194	8.702	8.966	10.457	9.682	9.333	9.633
Fishing's Share of Maine's Total Employment	1.6%	1.8%	1.9%	2.0%	1.9%	1.9%	2.2%	1.9%	1.8%	1.8%
GRAND TOTAL: Fishing-Farming-Forestry	**67.924**	**65.730**	**65.673**	**68.103**	**68.493**	**64.870**	**69.211**	**71.217**	**72.112**	**72.259**
Share of Maine's Total Employment	15.8%	15.4%	15.0%	14.9%	14.8%	14.1%	14.3%	14.3%	13.9%	13.6%
Private Non-Farm Employment	344.23	343.532	353.673	368.038	375.192	372.218	391.99	404.648	423.23	435.721
Government Employment	84.489	84.397	84.932	87.612	87.823	89.13	91.021	92.466	93.892	95.635
Maine Total Employment	428.719	427.929	438.605	455.65	463.015	461.348	483.011	497.114	517.122	531.356

Source of Information: Maine State Planning Office (January 2001)

MAINE Employment:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA estimates)

(Data expressed in thousands of Maine jobs)

	1980 (history)	1981 (history)	1982 (history)	1983 (history)	1984 (history)	1985 (history)	1986 (history)	1987 (history)	1988 (history)	1989 (history)
FORESTRY SECTOR:										
Paper (SIC 26)	17.929	18.141	17.829	17.853	18.147	17.867	17.262	16.84	17.748	17.693
Lumber (SIC 24)	17.077	16.448	15.343	16.264	17.631	17.169	17.237	18.344	17.079	16.384
Forestry (SIC 08 BEA/SPO estimate)	0.827	0.889	0.771	0.781	0.799	0.947	1.034	1.168	1.452	1.455
TOTAL: Forestry Sector Employment	35.833	35.478	33.943	34.898	36.577	35.983	35.533	36.352	36.279	35.532
Forestry's Share of Maine's Total Employment	6.7%	6.6%	6.3%	6.3%	6.4%	6.0%	5.7%	5.6%	5.3%	5.1%
FARMING SECTOR:										
Farm (BEA/REMI estimate)	16.253	15.337	14.628	15.915	14.658	13.169	13.312	12.822	12.522	11.913
Food MFG (Ag. related SIC 20 EMP)	7.241	6.612	6.237	5.780	5.520	5.710	5.638	5.511	5.317	4.851
Agricultural Services (SIC 07 BEA/SPO estimate)	3.089	3.408	3.641	3.803	3.958	4.327	4.744	5.415	5.679	5.82
TOTAL: Farming Sector Employment	26.583	25.357	24.506	25.498	24.136	23.206	23.694	23.748	23.518	22.584
Farming's Share of Maine's Total Employment	4.9%	4.7%	4.5%	4.6%	4.2%	3.9%	3.8%	3.7%	3.5%	3.2%
FISHING SECTOR: (SPO/DMR Estimate)										
Food MFG (Fish related SIC 20 EMP)	2.376	2.169	2.046	1.896	1.811	1.873	1.850	1.808	1.744	1.592
Commercial Fishing (SIC 09 BEA/SPO estimate)	8.042	7.292	7.728	6.435	6.409	7.196	7.576	4.324	4.496	4.504
TOTAL: Fishing Sector Employment	10.418	9.461	9.774	8.331	8.220	9.069	9.426	6.132	6.240	6.096
Fishing's Share of Maine's Total Employment	1.9%	1.8%	1.8%	1.5%	1.4%	1.5%	1.5%	1.0%	0.9%	0.9%
GRAND TOTAL: Fishing-Farming-Forestry	**72.834**	**70.297**	**68.223**	**68.727**	**68.933**	**68.258**	**68.653**	**66.232**	**66.037**	**64.212**
Share of Maine's Total Employment	13.5%	13.0%	12.6%	12.5%	12.0%	11.4%	11.1%	10.3%	9.7%	9.2%
Private Non-Farm Employment	440.931	442.111	443.416	453.133	476.814	495.805	518.084	540.08	572.035	585.676
Government Employment	97.626	96.843	97.829	98.859	99.111	101.204	103.035	104.514	108.026	110.632
Maine Total Employment	538.557	538.954	541.245	551.992	575.925	597.009	621.119	644.594	680.061	696.308

Source of Information: Maine State Planning Office (January 2001)

MAINE Employment:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA estimates)

(Data expressed in thousands of Maine jobs)

	1990 (history)	1991 (history)	1992 (history)	1993 (history)	1994 (history)	1995 (history)	1996 (history)	1997 (history)	1998 (history)	1999 (forecast)
FORESTRY SECTOR:										
Paper (SIC 26)	17.542	17.175	16.505	16.165	15.55	14.837	14.679	14.891	14.873	14.658
Lumber (SIC 24)	15.539	15.142	14.759	15.356	15.263	15.651	15.441	15.781	15.779	15.499
Forestry (SIC 08 BEA/SPO estimate)	1.345	1.131	1.257	1.238	1.36	1.362	1.394	1.394	1.417	1.434
TOTAL: Forestry Sector Employment	34.426	33.448	32.521	32.759	32.173	31.850	31.514	32.066	32.069	31.591
Forestry's Share of Maine's Total Employment	5.0%	5.0%	4.8%	4.8%	4.6%	4.5%	4.4%	4.4%	4.3%	4.2%
FARMING SECTOR:										
Farm (BEA/REMI estimate)	11.815	11.625	11.523	11.647	11.963	11.671	11.13	10.908	10.785	10.737
Food MFG (Ag. related SIC 20 EMP)	4.941	4.881	4.853	4.771	4.579	4.599	4.684	4.727	4.722	4.791
Agricultural Services (SIC 07 BEA/SPO estimate)	6.277	6.634	6.643	7.318	7.679	7.946	8.43	8.972	9.118	9.227
TOTAL: Farming Sector Employment	23.033	23.140	23.019	23.736	24.221	24.216	24.244	24.607	24.624	24.755
Farming's Share of Maine's Total Employment	3.3%	3.4%	3.4%	3.5%	3.5%	3.4%	3.4%	3.3%	3.3%	3.3%
FISHING SECTOR: (SPO/DMR Estimate)										
Food MFG (Fish related SIC 20 EMP)	1.611	1.479	1.428	1.526	1.817	1.653	1.704	1.518	1.431	1.434
Commercial Fishing (SIC 09 BEA/SPO estimate)	4.383	4.562	4.595	6.151	5.87	5.04	5.645	5.776	5.870	5.940
TOTAL: Fishing Sector Employment	5.994	6.041	6.023	7.677	7.687	6.693	7.349	7.294	7.301	7.374
Fishing's Share of Maine's Total Employment	0.9%	0.9%	0.9%	1.1%	1.1%	0.9%	1.0%	1.0%	1.0%	1.0%
GRAND TOTAL: Fishing-Farming-Forestry	**63.453**	**62.629**	**61.564**	**64.172**	**64.081**	**62.758**	**63.106**	**63.967**	**63.994**	**63.720**
Share of Maine's Total Employment	9.1%	9.3%	9.1%	9.3%	9.2%	8.9%	8.8%	8.7%	8.5%	8.4%
Private Non-Farm Employment	581.577	561.34	566.342	578.937	595.931	607.474	615.643	633.936	647.707	656.48
Government Employment	112.934	110.612	109.038	108.003	103.181	100.878	101.942	102.118	103.034	103.656
Maine Total Employment	694.511	671.952	675.38	686.94	699.112	708.352	717.585	736.054	750.741	760.136

Source of Information: Maine State Planning Office (January 2001)

MAINE Employment:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA estimates)

(Data expressed in thousands of Maine jobs)

	2000 (forecast)	2001 (forecast)	2002 (forecast)	2003 (forecast)	2004 (forecast)	2005 (forecast)	2006 (forecast)	2007 (forecast)	2008 (forecast)	2009 (forecast)
FORESTRY SECTOR:										
Paper (SIC 26)	14.698	14.807	14.822	14.69	14.545	14.388	14.179	14.233	14.291	14.364
Lumber (SIC 24)	15.406	15.64	15.799	15.798	15.702	15.556	15.478	15.59	15.692	15.816
Forestry (SIC 08 BEA/SPO estimate)	1.456	1.489	1.520	1.545	1.567	1.588	1.610	1.629	1.648	1.667
TOTAL: Forestry Sector Employment	31.560	31.936	32.141	32.033	31.814	31.532	31.267	31.452	31.631	31.847
Forestry's Share of Maine's Total Employment	4.1%	4.1%	4.1%	4.0%	3.9%	3.9%	3.8%	3.8%	3.8%	3.8%
FARMING SECTOR:										
Farm (BEA/REMI estimate)	10.687	10.638	10.589	10.541	10.491	10.443	10.394	10.345	10.295	10.247
Food MFG (Ag. related SIC 20 EMP)	4.735	4.793	4.835	4.863	4.883	4.896	4.895	4.885	4.878	4.876
Agricultural Services (SIC 07 BEA/SPO estimate)	9.374	9.586	9.781	9.946	10.088	10.221	10.359	10.482	10.607	10.732
TOTAL: Farming Sector Employment	24.796	25.017	25.205	25.350	25.462	25.561	25.648	25.711	25.779	25.855
Farming's Share of Maine's Total Employment	3.2%	3.2%	3.2%	3.2%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
FISHING SECTOR: (SPO/DMR Estimate)										
Food MFG (Fish related SIC 20 EMP)	1.553	1.572	1.586	1.595	1.602	1.606	1.606	1.602	1.600	1.600
Commercial Fishing (SIC 09 BEA/SPO estimate)	6.035	6.171	6.297	6.403	6.494	6.580	6.669	6.748	6.828	6.909
TOTAL: Fishing Sector Employment	7.588	7.744	7.883	7.998	8.096	8.187	8.275	8.350	8.429	8.509
Fishing's Share of Maine's Total Employment	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
GRAND TOTAL: Fishing-Farming-Forestry	**63.944**	**64.698**	**65.229**	**65.381**	**65.372**	**65.280**	**65.190**	**65.513**	**65.839**	**66.211**
Share of Maine's Total Employment	8.3%	8.3%	8.3%	8.2%	8.1%	8.0%	7.9%	7.9%	7.9%	7.9%
Private Non-Farm Employment	661.621	671.978	683.287	692.848	700.748	707.829	711.77	716.175	722.446	729.74
Government Employment	104.838	105.606	106.319	107.01	107.711	108.369	109.037	109.61	110.258	110.997
Maine Total Employment	766.459	777.584	789.606	799.858	808.459	816.198	820.807	825.785	832.704	840.737

Source of Information: Maine State Planning Office (January 2001)

MAINE Employment:

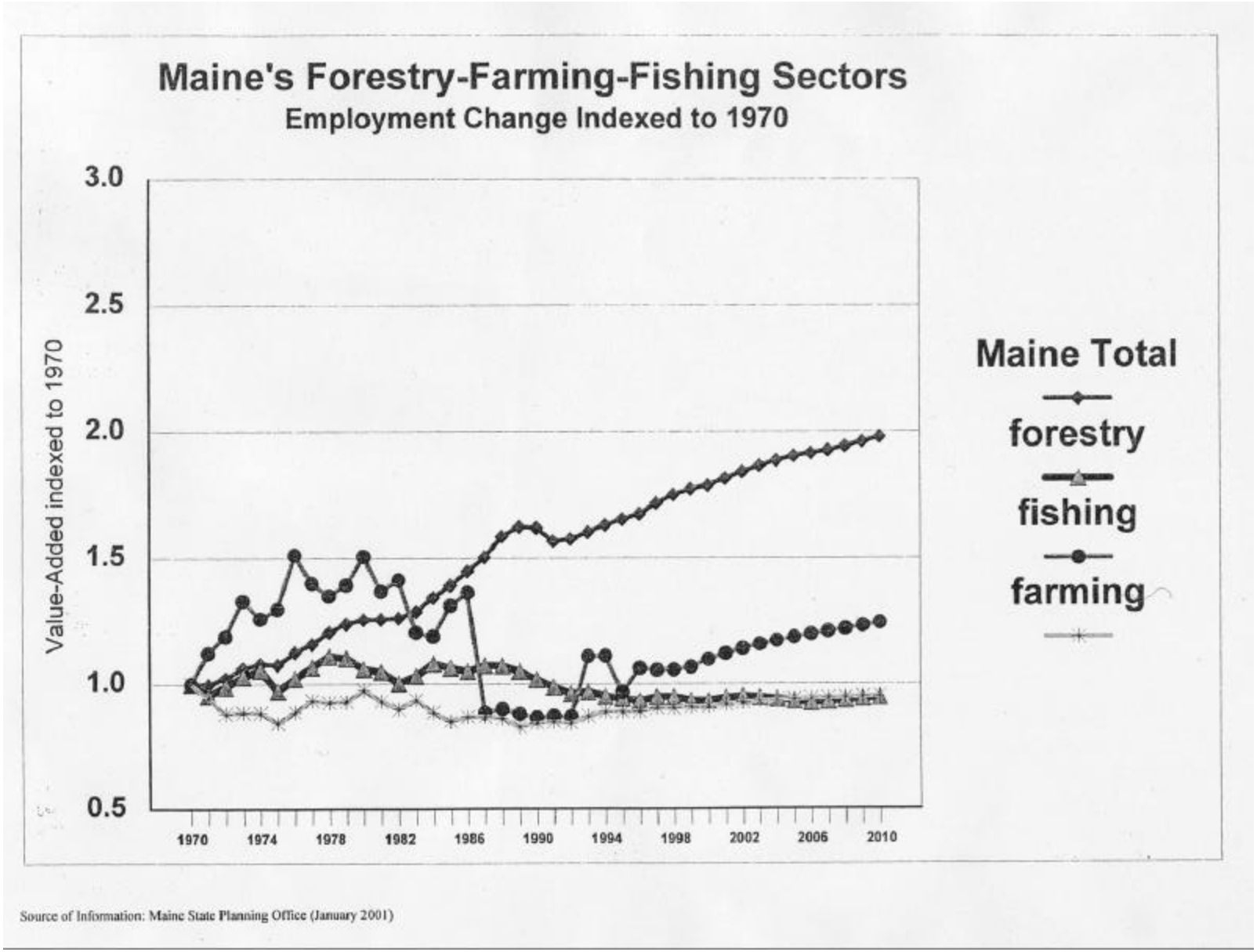
Forestry, Farming, Fishing Related

(SPO methodology, based on BEA estimates)

(Data expressed in thousands of Maine jobs)

	2010 (forecast)
FORESTRY SECTOR:	
Paper (SIC 26)	14.41
Lumber (SIC 24)	15.924
Forestry (SIC 08 BEA/SPO estimate)	1.687
TOTAL: Forestry Sector Employment	32.021
Forestry's Share of Maine's Total Employment	3.8%
FARMING SECTOR:	
Farm (BEA/REMI estimate)	10.198
Food MFG (Ag. related SIC 20 EMP)	4.875
Agricultural Services (SIC 07 BEA/SPO estimate)	10.857
TOTAL: Farming Sector Employment	25.930
Farming's Share of Maine's Total Employment	3.1%
FISHING SECTOR: (SPO/DMR Estimate)	
Food MFG (Fish related SIC 20 EMP)	1.599
Commercial Fishing (SIC 09 BEA/SPO estimate)	6.989
TOTAL: Fishing Sector Employment	8.589
Fishing's Share of Maine's Total Employment	1.0%
GRAND TOTAL: Fishing-Farming-Forestry	**66.539**
Share of Maine's Total Employment	7.8%
Private Non-Farm Employment	736.79
Government Employment	111.718
Maine Total Employment	848.508

Source of Information: Maine State Planning Office (January 2001)



Source of Information: Maine State Planning Office (January 2001)

MAINE Value Added:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA/SPO estimates)

(All figures expressed in billions of 1992 dollars)

	1970 (history)	1971 (history)	1972 (history)	1973 (history)	1974 (history)	1975 (history)	1976 (history)	1977 (history)	1978 (history)	1979 (history)	1980 (history)
FORESTRY SECTOR:											
Paper (SIC 2600)	$0.734	$0.738	$0.775	$0.821	$0.840	$0.881	$0.962	$0.976	$1.083	$1.101	$1.096
Lumber (SIC 2400)	$0.384	$0.380	$0.373	$0.413	$0.429	$0.364	$0.386	$0.394	$0.360	$0.383	$0.415
Forestry Services: SIC 08 (BEA/SPO estimate)	$0.013	$0.013	$0.014	$0.017	$0.018	$0.016	$0.020	$0.018	$0.018	$0.020	$0.023
TOTAL: Forestry Sector Value-Added	$1.131	$1.131	$1.162	$1.251	$1.287	$1.261	$1.368	$1.388	$1.461	$1.504	$1.534
Forestry's Share of Maine's Total Value-Added	8.3%	8.0%	7.7%	7.8%	8.0%	7.8%	8.0%	7.9%	8.0%	8.1%	8.1%
FARMING SECTOR:											
Farm (BEA/REMI estimate)	$0.200	$0.181	$0.177	$0.221	$0.263	$0.158	$0.277	$0.223	$0.167	$0.151	$0.149
Food MFG (Ag. related SIC 20 EMP)	$0.183	$0.189	$0.195	$0.186	$0.179	$0.161	$0.185	$0.216	$0.217	$0.223	$0.223
Agricultural Services: SIC 07 (BEA/SPO estimate)	$0.085	$0.084	$0.089	$0.108	$0.114	$0.104	$0.127	$0.119	$0.113	$0.129	$0.145
TOTAL: Farming Sector Value-Added	$0.468	$0.455	$0.461	$0.515	$0.556	$0.423	$0.589	$0.558	$0.497	$0.503	$0.517
Farming's Share of Maine's Total Value-Added	3.4%	3.2%	3.1%	3.2%	3.5%	2.6%	3.5%	3.2%	2.7%	2.7%	2.7%
FISHING SECTOR:											
Food MFG (Fish related SIC 20 EMP)	$0.059	$0.061	$0.063	$0.060	$0.057	$0.052	$0.059	$0.069	$0.070	$0.072	$0.072
Commercial Fishing: SIC 09 (BEA/SPO estimate)	$0.055	$0.054	$0.058	$0.069	$0.073	$0.067	$0.082	$0.077	$0.073	$0.083	$0.093
TOTAL: Fishing Sector Value-Added	$0.113	$0.115	$0.120	$0.129	$0.131	$0.119	$0.141	$0.146	$0.142	$0.155	$0.165
Fishing's Share of Maine's Total Value-Added	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%	0.8%	0.8%	0.8%	0.8%	0.9%
GRAND TOTAL: Fishing-Farming-Forestry	$1.713	$1.701	$1.743	$1.895	$1.973	$1.803	$2.097	$2.092	$2.100	$2.161	$2.215
Share of Maine's Total Value-Added	12.5%	12.1%	11.6%	11.9%	12.3%	11.2%	12.3%	11.9%	11.6%	11.6%	11.8%
Private Non-Farm (Maine Subtotal)	$10.939	$11.474	$12.367	$13.161	$13.267	$13.428	$14.175	$14.558	$15.129	$15.583	$15.752
Government (Maine Subtotal)	$2.510	$2.444	$2.539	$2.563	$2.543	$2.531	$2.607	$2.742	$2.855	$2.919	$2.953
Maine total V.A. (Gross State Product)	$13.649	$14.099	$15.083	$15.945	$16.073	$16.117	$17.059	$17.523	$18.151	$18.653	$18.854

Source of Information: Maine State Planning Office (January 2001)

MAINE Value Added:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA/SPO estimates)

(All figures expressed in billions of 1992 dollars)

	1981 (history)	1982 (history)	1983 (history)	1984 (history)	1985 (history)	1986 (history)	1987 (history)	1988 (history)	1989 (history)	1990 (history)	1991 (history)
FORESTRY SECTOR:											
Paper (SIC 2600)	$1.121	$1.079	$1.076	$1.212	$1.217	$1.204	$1.195	$1.418	$1.412	$1.381	$1.148
Lumber (SIC 2400)	$0.445	$0.436	$0.455	$0.529	$0.514	$0.492	$0.495	$0.444	$0.445	$0.396	$0.385
Forestry Services: SIC 08 (BEA/SPO estimate)	$0.015	$0.024	$0.018	$0.014	$0.022	$0.023	$0.018	$0.019	$0.020	$0.020	$0.020
TOTAL: Forestry Sector Value-Added	$1.581	$1.539	$1.549	$1.755	$1.753	$1.719	$1.708	$1.881	$1.877	$1.797	$1.553
Forestry's Share of Maine's Total Value-Added	8.2%	7.9%	7.6%	8.0%	7.7%	7.2%	6.8%	7.0%	6.8%	6.6%	5.9%
FARMING SECTOR:											
Farm (BEA/REMI estimate)	$0.195	$0.207	$0.226	$0.222	$0.221	$0.230	$0.260	$0.263	$0.254	$0.279	$0.233
Food MFG (Ag. related SIC 20 EMP)	$0.213	$0.210	$0.184	$0.193	$0.184	$0.210	$0.202	$0.267	$0.234	$0.223	$0.201
Agricultural Services: SIC 07 (BEA/SPO estimate)	$0.095	$0.153	$0.118	$0.093	$0.143	$0.150	$0.113	$0.125	$0.131	$0.129	$0.128
TOTAL: Farming Sector Value-Added	$0.503	$0.569	$0.528	$0.508	$0.547	$0.590	$0.575	$0.655	$0.619	$0.631	$0.562
Farming's Share of Maine's Total Value-Added	2.6%	2.9%	2.6%	2.3%	2.4%	2.5%	2.3%	2.4%	2.2%	2.3%	2.1%
FISHING SECTOR:											
Food MFG (Fish related SIC 20 EMP)	$0.068	$0.067	$0.059	$0.062	$0.059	$0.068	$0.065	$0.086	$0.075	$0.072	$0.065
Commercial Fishing: SIC 09 (BEA/SPO estimate)	$0.061	$0.098	$0.076	$0.060	$0.092	$0.097	$0.073	$0.081	$0.084	$0.083	$0.082
TOTAL: Fishing Sector Value-Added	$0.130	$0.166	$0.135	$0.122	$0.151	$0.164	$0.137	$0.166	$0.159	$0.155	$0.147
Fishing's Share of Maine's Total Value-Added	0.7%	0.8%	0.7%	0.6%	0.7%	0.7%	0.5%	0.6%	0.6%	0.6%	0.6%
GRAND TOTAL: Fishing-Farming-Forestry	$2.213	$2.274	$2.212	$2.386	$2.452	$2.474	$2.420	$2.703	$2.655	$2.582	$2.262
Share of Maine's Total Value-Added	11.5%	11.6%	10.9%	10.9%	10.7%	10.3%	9.6%	10.1%	9.6%	9.4%	8.6%
Private Non-Farm (Maine Subtotal)	$16.129	$16.237	$16.918	$18.475	$19.255	$20.254	$21.279	$22.709	$23.385	$22.892	$21.963
Government (Maine Subtotal)	$2.951	$3.074	$3.184	$3.284	$3.414	$3.560	$3.718	$3.872	$4.060	$4.182	$4.123
Maine total V.A. (Gross State Product)	$19.275	$19.518	$20.328	$21.981	$22.890	$24.044	$25.257	$26.844	$27.699	$27.353	$26.319

Source of Information: Maine State Planning Office (January 2001)

MAINE Value Added:

Forestry, Farming, Fishing Related

(SPO methodology, based on BEA/SPO estimates)

(All figures expressed in billions of 1992 dollars)

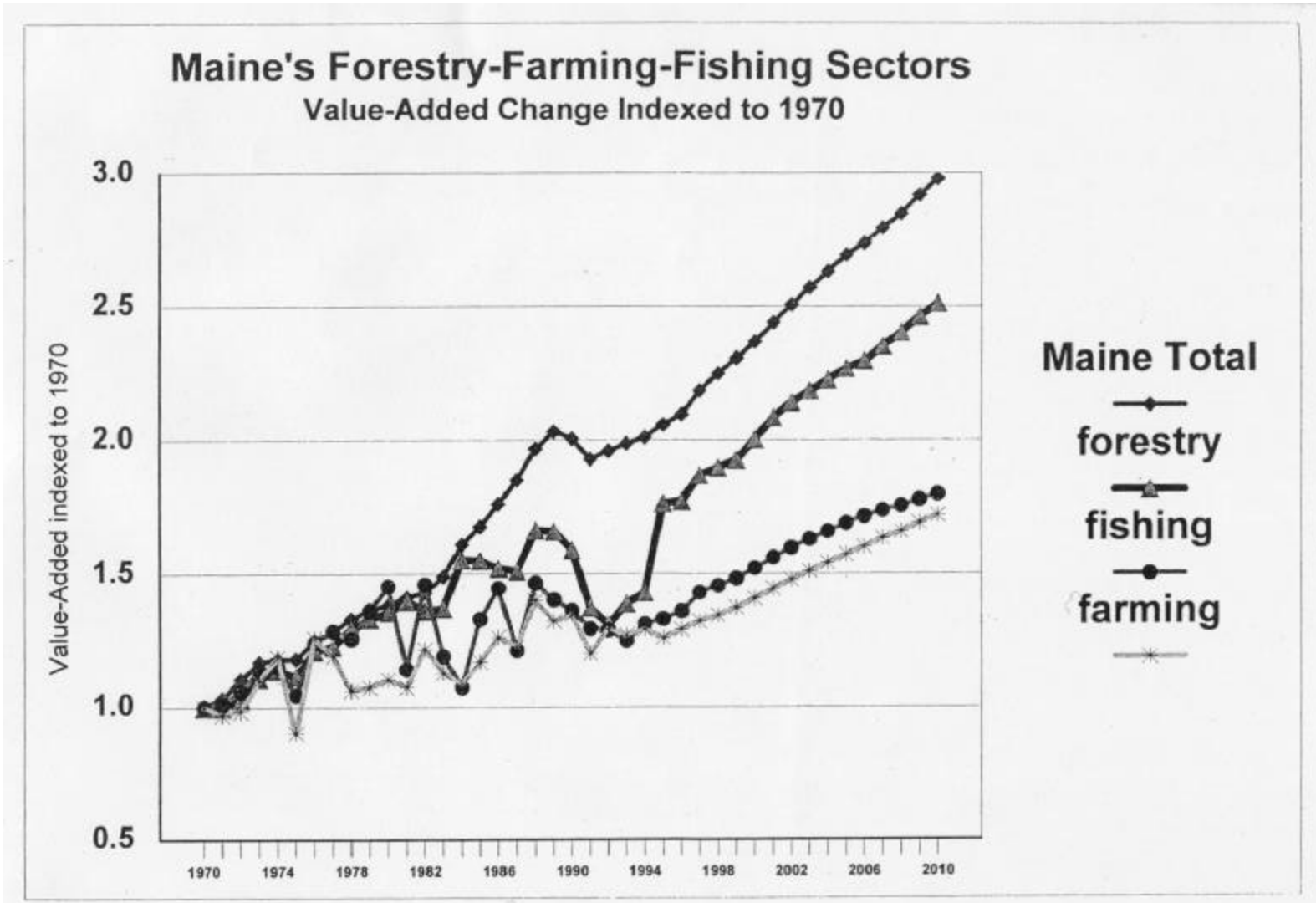
	1992 (history)	1993 (history)	1994 (history)	1995 (history)	1996 (history)	1997 (history)	1998 (history)	1999 (forecast)	2000 (forecast)	2001 (forecast)	2002 (forecast)
FORESTRY SECTOR:											
Paper (SIC 2600)	$1.067	$1.170	$1.171	$1.631	$1.646	$1.739	$1.768	$1.802	$1.876	$1.955	$2.009
Lumber (SIC 2400)	$0.394	$0.381	$0.427	$0.345	$0.338	$0.354	$0.355	$0.354	$0.366	$0.378	$0.386
Forestry Services: SIC 08 (BEA/SPO estimate)	$0.021	$0.019	$0.019	$0.019	$0.020	$0.022	$0.022	$0.022	$0.023	$0.024	$0.024
TOTAL: Forestry Sector Value-Added	$1.482	$1.570	$1.617	$1.995	$2.004	$2.115	$2.145	$2.178	$2.265	$2.357	$2.419
Forestry's Share of Maine's Total Value-Added	5.5%	5.8%	5.9%	7.1%	7.0%	7.1%	7.0%	6.9%	7.0%	7.1%	7.1%
FARMING SECTOR:											
Farm (BEA/REMI estimate)	$0.284	$0.276	$0.264	$0.243	$0.252	$0.254	$0.258	$0.264	$0.270	$0.277	$0.283
Food MFG (Ag. related SIC 20 EMP)	$0.187	$0.195	$0.219	$0.223	$0.224	$0.226	$0.229	$0.234	$0.241	$0.247	$0.254
Agricultural Services: SIC 07 (BEA/SPO estimate)	$0.134	$0.123	$0.122	$0.123	$0.128	$0.140	$0.142	$0.145	$0.148	$0.152	$0.155
TOTAL: Farming Sector Value-Added	$0.605	$0.594	$0.605	$0.589	$0.604	$0.619	$0.629	$0.643	$0.659	$0.676	$0.692
Farming's Share of Maine's Total Value-Added	2.3%	2.2%	2.2%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	2.0%	2.0%
FISHING SECTOR:											
Food MFG (Fish related SIC 20 EMP)	$0.060	$0.063	$0.070	$0.072	$0.072	$0.072	$0.074	$0.075	$0.077	$0.079	$0.081
Commercial Fishing: SIC 09 (BEA/SPO estimate)	$0.086	$0.079	$0.079	$0.079	$0.082	$0.090	$0.092	$0.093	$0.095	$0.098	$0.100
TOTAL: Fishing Sector Value-Added	$0.146	$0.142	$0.149	$0.151	$0.154	$0.162	$0.165	$0.168	$0.173	$0.177	$0.181
Fishing's Share of Maine's Total Value-Added	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
GRAND TOTAL: Fishing-Farming-Forestry	$2.233	$2.305	$2.371	$2.735	$2.762	$2.896	$2.940	$2.989	$3.096	$3.210	$3.292
Share of Maine's Total Value-Added	8.4%	8.5%	8.6%	9.7%	9.7%	9.7%	9.6%	9.5%	9.6%	9.6%	9.6%
Private Non-Farm (Maine Subtotal)	$22.439	$22.977	$23.473	$24.215	$24.710	$25.917	$26.743	$27.489	$28.282	$29.234	$30.123
Government (Maine Subtotal)	$4.009	$3.849	$3.680	$3.598	$3.620	$3.634	$3.670	$3.692	$3.735	$3.764	$3.791
Maine total V.A. (Gross State Product)	$26.732	$27.102	$27.417	$28.056	$28.582	$29.805	$30.671	$31.445	$32.287	$33.274	$34.198

Source of Information: Maine State Planning Office (January 2001)

MAINE Value Added:
Forestry, Farming, Fishing Related
(SPO methodology, based on BEA/SPO estimates)
(All figures expressed in billions of 1992 dollars)

	2003 (forecast)	2004 (forecast)	2005 (forecast)	2006 (forecast)	2007 (forecast)	2008 (forecast)	2009 (forecast)	2010 (forecast)
FORESTRY SECTOR:								
Paper (SIC 2600)	$2.052	$2.095	$2.138	$2.163	$2.219	$2.268	$2.326	$2.374
Lumber (SIC 2400)	$0.392	$0.396	$0.399	$0.405	$0.413	$0.421	$0.430	$0.438
Forestry Services: SIC 08 (BEA/SPO estimate)	$0.025	$0.025	$0.025	$0.026	$0.026	$0.027	$0.027	$0.027
TOTAL: Forestry Sector Value-Added	$2.469	$2.516	$2.562	$2.594	$2.658	$2.716	$2.783	$2.839
Forestry's Share of Maine's Total Value-Added	7.0%	7.0%	7.0%	6.9%	7.0%	7.0%	7.0%	7.0%
FARMING SECTOR:								
Farm (BEA/REMI estimate)	$0.290	$0.297	$0.304	$0.311	$0.320	$0.328	$0.337	$0.345
Food MFG (Ag. related SIC 20 EMP)	$0.259	$0.263	$0.268	$0.272	$0.275	$0.278	$0.282	$0.284
Agricultural Services: SIC 07 (BEA/SPO estimate)	$0.158	$0.161	$0.164	$0.167	$0.169	$0.171	$0.173	$0.175
TOTAL: Farming Sector Value-Added	$0.707	$0.722	$0.736	$0.750	$0.764	$0.777	$0.792	$0.805
Farming's Share of Maine's Total Value-Added	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
FISHING SECTOR:								
Food MFG (Fish related SIC 20 EMP)	$0.083	$0.085	$0.086	$0.087	$0.088	$0.089	$0.090	$0.091
Commercial Fishing: SIC 09 (BEA/SPO estimate)	$0.102	$0.104	$0.106	$0.107	$0.109	$0.110	$0.111	$0.113
TOTAL: Fishing Sector Value-Added	$0.185	$0.188	$0.192	$0.195	$0.197	$0.199	$0.202	$0.204
Fishing's Share of Maine's Total Value-Added	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
GRAND TOTAL: Fishing-Farming-Forestry	$3.361	$3.426	$3.491	$3.538	$3.620	$3.692	$3.776	$3.848
Share of Maine's Total Value-Added	9.6%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Private Non-Farm (Maine Subtotal)	$30.942	$31.754	$32.566	$33.134	$33.861	$34.558	$35.449	$36.212
Government (Maine Subtotal)	$3.818	$3.845	$3.870	$3.896	$3.948	$3.990	$4.050	$4.097
Maine total V.A. (Gross State Product)	$35.050	$35.896	$36.740	$37.341	$38.129	$38.876	$39.836	$40.654

Source of Information: Maine State Planning Office (January 2001)



Source of Information: Maine State Planning Office (January 2001)

Fishing Industry Economic Data

Official labor statistics for fisheries employment and economic contribution significantly undercount the actual employment and economic contribution of this industry. To make an accurate comparison of fishing, farming and agriculture, the full impact of the fishing industry on the state economy needs to be understood. A full explanation is given below.

Labor statistics are based on a person's primary occupation. Fishing is a seasonal or part-time activity for thousands of Maine people. Many of these people report their income in other labor categories, such as teaching or carpentry. This is particularly true for people that crew on fishing boats. Fishing statistics don't capture this activity.

Second, there are a large number of small businesses that support the fishing industry such as marinas, fish buying stations, boat repair and so forth. These businesses are reported in a variety of labor categories other than fishing.

Finally, fishing has long been based on an informal, cash economy. There are many people who provide services to the fishing industry on a non-employee, non-contracted basis. Typically, family and community members provide engine repair, boat painting, net and trap making and book-keeping to fishermen on an informal basis. These contributions are not captured in fishing industry statistics.

Below is a table showing employment estimates of the fishing industry. Column A gives estimates using official labor statistics. Column B gives estimates using an approach that combines fishing license data and actual surveys.

Category	A. Labor Statistics	B. Estimates Based on License and Survey Data
Full time fishing	6035	6000
Part-time fishing	---	4300
Informal Services	---	2500
Seafood Processing	1553	2400
Total:	7534	15,200

Appendix G

Business Development Programs

Tax Exemption and Tax Incentive Programs

Maine Agriculture, Aquaculture and Commercial Fishing Sales Tax Exemption
Maine Business Equipment Tax Reimbursement
Maine Employment Tax Increment Financing
Maine Farm and Open Space Tax Law
Maine Fuel and Electricity Sales Tax Exemption
Maine Jobs and Investment Tax Credit
Maine Machinery and Equipment Sales Tax Exemption
Maine Research and Development Tax Credit
Maine Seed Capital Tax Credit
Maine State Tax Increment Financing
Maine Tax Increment Financing
Maine Tree Growth Tax Law

Monetary Grant Programs

Maine Department of Agriculture Meat Inspection Grants
Maine Department of Agriculture Nutrient Management Grants
Maine Technology Institute Cluster Grants
Maine Technology Institute Seed Grants
U.S. Department of Agriculture Business Enterprise Grants
U.S. Department of Agriculture Ice Storm Recovery Funds
U.S. Department of Agriculture Marketing Loss Assistance
U.S. Department of Agriculture Production Flexibility Contracts
U.S. Department of Commerce Economic Development Administration Marketing Grants
U.S. Department of Housing and Urban Development Community Development Block Grants

Direct Loan Programs

Finance Authority of Maine Adaptive Equipment Loans
Finance Authority of Maine Agricultural Marketing Loan Fund
Finance Authority of Maine Colby Downtown Direct Loans
Finance Authority of Maine Daycare Direct Loans
Finance Authority of Maine Economic Recovery Loans
Finance Authority of Maine Intermediary Relending Program
Finance Authority of Maine Municipal Securities Approval Program
Finance Authority of Maine Nutrient Management Loans

Finance Authority of Maine Occupational Safety Loans
Finance Authority of Maine Oil Storage Facility Removal and Replacement Program
Finance Authority of Maine Potato Marketing Improvement Fund
Finance Authority of Maine Regional Economic Development Revolving Loan Fund
Finance Authority of Maine Obligation Securities Program
Finance Authority of Maine Small Enterprise Growth Fund
Finance Authority of Maine SMART Bonds
Finance Authority of Maine Waste Reduction and Recycling Loan Program
U.S. Department of Agriculture Business and Industry Loans
U.S. Department of Agriculture Rural Economic Development Loans
U.S. Department of Agriculture Intermediary Relending
U.S. Department of Agriculture Farm Operating Loans for Non-Socially Disadvantaged Beginning Farmers
U.S. Department of Agriculture Farm Operating Loans for Non-Socially Disadvantaged Experienced Farmers
U.S. Department of Agriculture Farm Ownership Loans for Socially Disadvantaged Beginning Farmers
U.S. Department of Agriculture Farm Ownership Loans for Non-Socially Disadvantaged Beginning Farmers
U.S. Department of Agriculture Farm Ownership Loans for Socially Disadvantaged Experienced Farmers
U.S. Department of Agriculture Farm Ownership Loans for Non-Socially Disadvantaged Experienced Farmers
U.S. Department of Commerce Economic Development Administration Revolving Loan Funds
U.S. Department of Housing and Urban Development Community Development Block Grant Business Assistance Program

Insured, Guaranteed and Arranged Loan Programs

Finance Authority of Maine Commercial Loan Insurance
Finance Authority of Maine Linked Investment Program for Agriculture and Small Business
Finance Authority of Maine Rapid Response Guaranty
Finance Authority of Maine Small Business Loan Insurance
Finance Authority of Maine Veteran's Small Business Loan Insurance
U.S. Department of Agriculture Business and Industry Guaranteed Loans
U.S. Department of Agriculture Farm Operating Loan Guarantees
U.S. Department of Agriculture Farm Ownership Loan Guarantees
U.S. Small Business Administration 7(A) Loan Guaranty Program
U.S. Small Business Administration Y2K Action Loan Program
U.S. Small Business Administration SBA LowDoc Loan Program
U.S. Small Business Administration SBA Express
U.S. Small Business Administration Community Express
U.S. Small Business Administration Community Adjustment and Investment Program

U.S. Small Business Administration Certified Development Company Loan Program
U.S. Small Business Administration International Trade Loans
U.S. Small Business Administration Export Working Capital Program
U.S. Small Business Administration Pollution Control Loans
U.S. Small Business Administration Defense Loan and Technical Assistance Program
U.S. Small Business Administration Prequalification Pilot Loan Program
U.S. Small Business Administration Qualified Employee Trusts Loan Program
U.S. Small Business Administration Microloan Program

Technical Assistance Programs

Maine Department of Conservation Forest Policy and Management Division Technical Assistance
Maine Department of Economic and Community Development Business Development Technical Assistance
U.S. Department of Agriculture Cooperative Services Program
U.S. Department of Commerce Maine Manufacturing Extension Partnership
U.S. Small Business Administration Small Business Development Centers

Worker Training Programs

Maine Department of Labor Governor's Training Initiative
Maine Technical College System Maine Quality Centers
U.S. Department of Commerce Economic Development Administration Business Based Training Grants